Colorado State University

Knowledge to Go Places

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The attached proposal is being submitted to you for your consideration by a NOAA Cooperative Institute. Should you recommend funding for this proposal, we request that the funding be transferred through our current NOAA cooperative agreement, # NA09OAR4320074. The NOAA contact (described below) for this cooperative agreement should be contacted immediately if this proposal is accepted for funding.

Title of Proposal: Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution

Principal Investigator(s): Renate Brummer

Proposal # 115688

Period of Performance: August 1, 2013 - July 31, 2015

Funding (by year, if multi-year): YR1--$12,000; YR2--$12,000; TOTAL--$24,000

Task #: 3

Theme(s): Regional to Global Scale Modeling

DUNS #: 78-597-9618

EIN# 84-6000545

Congressional District: CO-002

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(1) Is there a former DOC employee working for the CI host institution who represented or will represent the host institution before DOC or another Federal agency regarding this proposal? No

(2) Does this award include any subaward to a Minority Serving Institution? No

(3) Does the proposed award require any non-federal employees or subawardees to have physical access to Federal premises for more than 180 days or to access a Federal information system? No.

(4) Is PROGRAM INCOME anticipated being earned during performance of this project? No

(5) Will a VIDEO be created for public viewing as part of this project? No

(6) Will DOC/NOAA owned equipment be provided to any investigator for use outside of a Federal location for this project? No

(7) Are any permits required to conduct this project? (If yes, please provide the name of the issuing agency and the permit number.) No

New Proposal

RESEARCH PROPOSAL SUBMITTED
TO THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)
Joint Hurricane Testbed (JHT) Program

TITLE: Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution

PERFORMANCE PERIOD: August 1, 2013 – July 31, 2015

AMOUNT REQUESTED:

Year 1: CIMSS: $41,649 NCAR: $52,498 CIRA: $12,000 Total: $106,147
Year 2: CIMSS: $44,319 NCAR: $51,855 CIRA: $12,000 Total: $108,174

SUBMITTING DATE: December 7, 2012

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Empirical-Dynamical Modeling of Tropical Cyclone Structure Evolution

A Proposal to

National Oceanic and Atmospheric Administration
Office of Oceanic and Atmospheric Research
Joint Hurricane Testbed Opportunities for Transfer of Research and Technology Into Tropical Cyclone Analysis and Forecast Operations

For the Period
August 1, 2013 to July 31, 2015

Year 1 Support Requested: $41,649
Year 2 Support Requested: $44,319
Total Support Requested: $85,968

Submitting Date: December 7, 2012

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November 2012

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NCAR

New Proposal

RESEARCH PROPOSAL SUBMITTED
TO THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)
Joint Hurricane Testbed (JHT) Program
For the
National Center for Atmospheric Research (NCAR)
P.O. Box 3000
Boulder, CO 80307-3000

TITLE: Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution
INSTITUTIONAL PRINCIPAL INVESTIGATOR: Jonathan Vigh
PERFORMANCE PERIOD: August 1, 2013 – July 31, 2015
AMOUNT REQUESTED:
Year 1: NCAR: $52,498
Year 2: NCAR: $51,855

SUBMITTING DATE: December 7, 2012

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30 Nov 2012

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New proposal to

National Oceanic & Atmospheric Administration (NOAA)
Joint Hurricane Testbed (JHT) Program
for

Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution

by

Cooperative Institute for Research in the Atmosphere
Colorado State University
1375 Campus Delivery
Fort Collins, CO 80523-1375

PRINCIPAL INVESTIGATOR: Dr. Renate Brummer (CSU/CIRA)

COLLABORATORS: Dr. Mark DeMaria (NOAA/NESDIS/StAR)
Dr. John Knaff (NOAA/NESDIS/StAR)

PERIOD OF ACTIVITY: August 1, 2013 – July 31, 2015

AMOUNT REQUESTED: Year 1: CIRA/CSU $12,000
Year 2: CIRA/CSU $12,000

SUBMITTING DATE: December 7, 2012

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Empirical-Dynamical Modeling of Tropical Cyclone Structure Evolution

Co-Principal Investigators: Christopher Rozoff (CIMSS) and Jonathan Vigh (NCAR/RAL)
Co-Is: Renate Brummer (CIRA) and Barb Brown (NCAR/RAL)
Collaborators: John Knaff (NESDIS) and Mark DeMaria (NESDIS)

(B) Abstract

The National Hurricane Center (NHC) currently has a well-established suite of track and intensity prediction tools but lacks an equivalent array of tropical cyclone (TC) structure forecast guidance products. To improve the operational prediction of TC structure, an empirical-dynamical modeling framework is proposed to improve upon the current wind radius climatology and persistence model (DRCL). This modeling system will provide 120-h forecasts of the radius of maximum winds (RMW) and the outermost radial extent of the 34-, 50-, and 64-kt tangential winds in the four geographical quadrants around the TC for both the Atlantic and East Pacific Ocean basins. The proposed modeling system is based on a double modified Rankine vortex. The model's parameters and predictors will be derived from various retrospective developmental datasets.

A variety of empirical-dynamical models will be developed and tested against the DRCL and official NHC forecasts, along with a baseline model. The baseline model will incorporate an optimal combination of infrared (IR) imagery-based predictors from geostationary satellites and environmental and storm-structure information from the Global Forecast System (GFS) analyses and forecasts. A second class of models will incorporate flight-level observations and vortex data messages. Passive microwave data will also be utilized in a third class of models. The potential for ensemble and probabilistic forecasts with these new forecasting tools will be evaluated as well. The final empirical-dynamical modeling system resulting from the proposed model development and testing will be run as part of the Statistical Hurricane Intensity Prediction Scheme/Logistic Growth Equation Model (SHIPS/LGEM) software. The 120-h forecasts will be provided in the SHIPS text-based output. The radii values will also be provided in the Automated Tropical Cyclone Forecasting (ATCF) a-deck format. Later in the project, the model will be extended to provide 7-day forecasts, subject both to NHC interest and whether these forecasts show skill.

Preliminary results with the baseline double modified Rankine vortex model show significant promise that the forecast skill of TC structure prediction can improve with innovations to existing, computationally efficient statistical models. Improved guidance for TC size/wind structure will be very helpful for a number of NHC forecast priorities. Having an improved model for significant wind radii directly supports NHC's 6th-ranked forecast priority of enhancing operational storm surge forecast accuracy. By potentially contributing a 7-day climatology-persistence skill baseline model for structure, this project may also enhance NHC's 9th forecast priority of providing tools to evaluate skill for 7-day forecasts. Finally, more accurate depictions of wind structure could also improve the accuracy of operational intensity forecasts and facilitate the development of "guidance on guidance" for intensity forecasts [e.g. Hurricane Isaac's (2012) slow/late intensification]. This would directly contribute to NHC's 3rd highest forecast priority of developing statistically-based guidance on guidance that assists with the determination of official intensity errors.

C) Statement of Work

C1. Project Duration: 2 years

C2. Project Description

a. Background

Accurate diagnosis and prediction of a tropical cyclone's (TC) wind structure is vital for assessing the wind hazard posed to marine interests and onshore populations. The National Hurricane Center (NHC) and the Joint Typhoon Warning Center (JTWC) currently provide official forecasts of significant TC wind radii (i.e. 34-, 50-, and 64-kt wind radii, hereafter R34, R50, and R64) out through various lead-times. These significant wind radii forecasts are used as inputs in a variety of other operational guidance aids, including the TC Wind Speed Probability Forecast Product (DeMaria et al 2009), the Probabilistic Hurricane Storm Surge model (P-surge, Taylor and Glahn 2008), and certain wave prediction aids (e.g., Sampson et al 2012). Additionally, the forecast for R50 is used in setting TC Conditions of Readiness for Department of Defense installations (Sampson et al 2012).

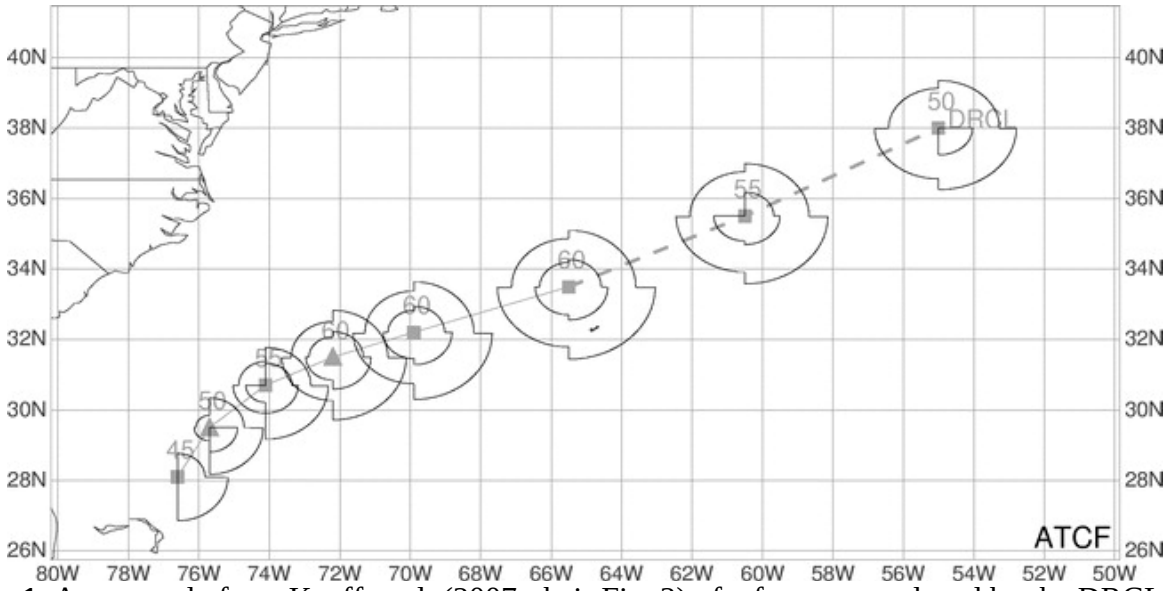

Fig. 1. An example from Knaff et al. (2007; their Fig. 2) of a forecast produced by the DRCL for Tropical Storm Franklin (2005). The contours show the radius of 34-kt and 50-kt winds for forecasts at 0, 12, 24, 36, 48, 72, 96, and 120 h.

Despite the importance of significant wind radii for surge and wind impact forecasting (e.g., the coastal surge for `Superstorm' Sandy was likely under predicted in part due to the failure of existing guidance products to account for the very large size of that storm), NHC currently possesses a limited set of tools to predict TC wind structure. These include a basic wind-radius climatology-persistence (CLIPER) model (the McAdie wind-radii CLIPER—MRCL, McAdie 2004), another CLIPER-type statistical-parametric model that incorporates the

expected wavenumber-1 asymmetry based on storm motion (the DeMaria CLIPER model – DRCL; Knaff et al 2007; hereafter K07), and the raw wind radii output by cyclone trackers for the various regional and global models. Each of these aids provides predictions of R34, R50, and R64 for each quadrant out through 5 days (e.g., Fig 1). The CLIPER aids suffer from high bias and root mean square error (RMSE) (e.g., Fig. 2), while the regional and global models have other issues including the overdevelopment of TCs undergoing extratropical transition and the underdevelopment of small TCs, with an accompanying high bias in the size of small TCs. Given the success of SHIPS in incorporating dynamical model output in a prediction framework for intensity prediction, we have developed a prototype structure model that uses a similar empirical-dynamical approach. We now describe our efforts to expand this empirical-dynamical modeling system to substantially improve both the overall skill and the utility of real-time wind structure prediction.

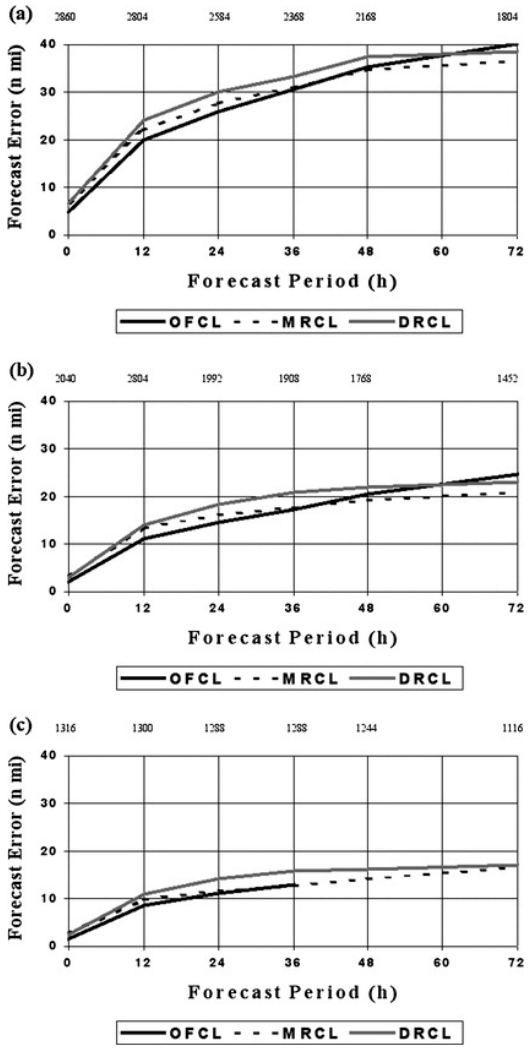

Fig. 2. A figure from K07 (their Fig. 3) showing the 2004-2005 mean absolute error of the (a) 34-, (b) 50-, and (c) 64-kt wind radii forecasts through 72 h for the official forecast (OFCL), MRCL, and DCRL.

b. A wind radii prediction model based on the double Rankine vortex profile

We propose to implement a statistical-dynamical modeling system derived from retrospective developmental data. This model will provide 120-h forecasts of the radius of maximum winds (RMW) and the outermost radial extent of R34, R50, and R64 in the four geographical quadrants around the TC and will be developed for both the Atlantic and East Pacific Ocean basins. Similar to the single modified Rankine vortex model (SRVM) described in K07, we will use a double modified Rankine vortex model (DRVM). This model for tangential wind $v = v(r, \theta)$, where r is the distance from the TC's center and θ is the azimuthal angle of geographical quadrant being forecasted, is expressed as follows:

$$v(r,\theta) = a\cos(\theta - \theta_a) + b\cos[2(\theta - \theta_b)] + (v_1 - a - b)\begin{cases} \left(\frac{r}{r_1}\right) & \text{for } r < r_1, \\ \left(\frac{r_1}{r}\right)^{x_1} & \text{for } r_1 \le r < r_2, \\ \left(\frac{r_1}{r_2}\right)^{x_1}\left(\frac{r_2}{r}\right)^{x_2} & \text{for } r \ge r_2. \end{cases} \quad (1)$$

Here, v_1 is the known maximum wind speed. In (1), there are also 7 free parameters that must be determined from the climatological data – these include the radius of maximum wind r_1, the radius r_2 where the two modified Rankine vortex profiles meet, the size parameters x_1 and x_2 that determine how quickly the wind decays with distance from the TC's center and r_2, respectively, the amplitudes a and b that respectively account for wavenumber-1 and -2 asymmetries associated with TC motion and vertical wind shear, and the angles θ_a and θ_b that define the orientation from due north of the wavenumber-1 and -2 asymmetries, respectively. An example of the wind field produced by (1) is shown in Fig. 3.

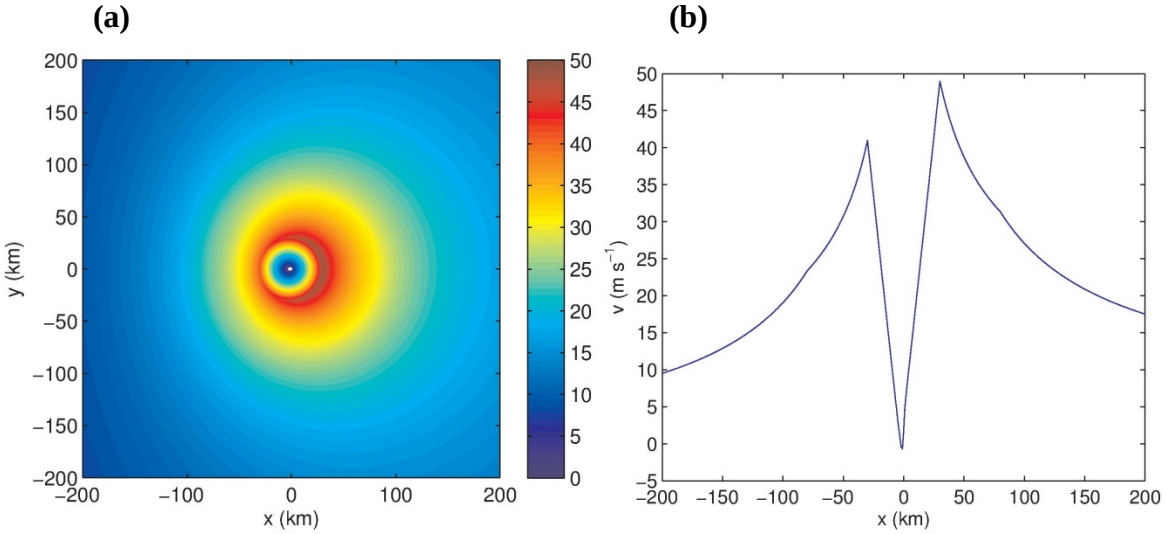

Fig. 3. An example of equation 1 for (a) the horizontal wind field and (b) a horizontal cross section at y = 0 km in (a).

Equation 1 will yield a variety of models since several developmental datasets will be available for model development (described below). As in K07, we are estimating the time-dependent free parameters in (1) via linear regression. For each model, there are a number of free parameters that must be estimated. Generically denoting each free parameter (e.g., v_2, r_1, θ_a, etc.) as ψ, we can then define ψ as a linear combination of predictors that we define here as x_i:

$$\psi = c_0 + c_1 x_1 + c_2 x_2 + \cdots + c_N x_N, \quad (2)$$

where c_i are parameters that are fit to the developmental data using the scaled method described in K07. In this method, the coefficients in (2) that minimize the RMSE between the observed and predicted R34, R50, and R64 are chosen for the prediction model. We will also consider more general nonlinear regression using simulated evolution (e.g., Bakhshaii and Stull 2009, Roebber 2010), although linear regression as described in (2) appears quite promising by itself. Regardless of the form of (2), once the model is derived from the developmental dataset, R34, R50, and R64 are obtained directly from (1) to create forecasts at each lead-time based on observed predictor values.

c. Baseline model

A hierarchy of models will be developed from the DRVM. The most basic model will provide a baseline of forecast skill of the more sophisticated models described below. For the baseline model, a structure developmental dataset will be composed of the RMW, R34, R50, and R64 data from the NHC best track and Automated Tropical Cyclone Forecast (ATCF) A-decks (operational wind radii estimates prior to 2004 will be obtained from the extended best track for the cases which have data deemed to be of sufficient quality). The SRVM DRCL of K07 incorporates these data; the DRCL is trained on a TC's current intensity, latitude, speed and direction of movement, along with persistence. As part of a NOAA GOES-R grant, a DRVM incorporating environmental predictors and satellite IR structure predictors from the SHIPS developmental dataset (DeMaria et al. 2005) is currently being developed at CIRA. The SHIPS developmental data comes from the GFS analyses data and the Geostationary Operational Environmental Satellite (GOES) imagery. Augmenting SRVM and DRVMs with additional physical data appears quite promising in preliminary testing.

Figure 4 shows preliminary results with SRVM and DRVM models derived from the ATCF/extended best track and SHIPS developmental datasets for the years 1989 - 2011. This figure shows the RMSE of the model fit to climatological data for 3 models: a basic SRVM developed to closely follow the climatological component of the DRCL, an SRVM that is enhanced with an additional predictor (the GFS-analyzed tangential wind azimuthally averaged at 500-km radius), and a simple DRVM that just uses the basic latitude, storm motion, and wind speed information that is used in the DRCL model. The incorporation of the additional parameter in SRVM 2 reduces the RMSE by 9%. The use of the double modified Rankine vortex profile results in an even more impressive 37% reduction in RMSE. Thus, adding additional predictors

to the models and/or upgrading the wind profile to the double modified Rankine vortex models appear to substantially increase the ability of the model to fit the climatological structure data. The final version of the SRVM and DRVM models, along with the model variations described below, will be evaluated against the performance of the DRCL in the real-time testing environment.

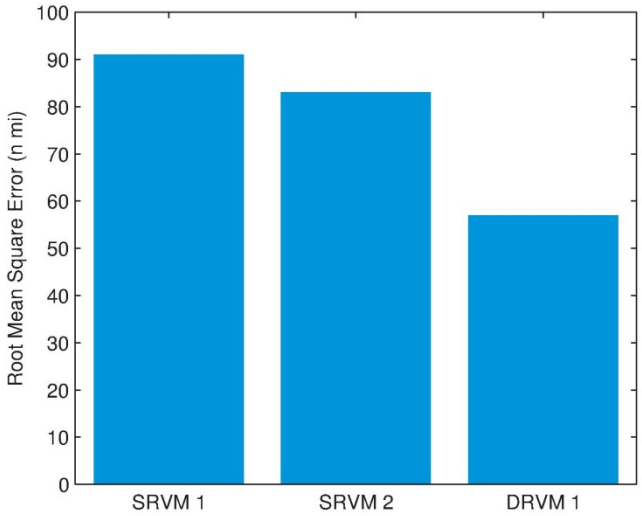

Fig. 4. An example of the improvement in RMSE (n mi) for a variety of models. SRVM 1 is an SRVM developed similarly to the climatology portion of the DRCL using only latitude, storm motion, and wind speed. SRVM 2 is a model that incorporates the same predictors as SRVM 1, but also includes the GFS-analyzed surface wind speed averaged at 500-km radius. As in SRVM 1, DRVM 1 is a DRVM using only the latitude, storm motion, and wind speed for its predictors.

d. Incorporation of real-time aircraft data

Flight-level observations and a vortex data message (VDM) archive maintained by the team members will be used to create an enhanced version of the DRVM. The wind information derived from these data can help in multiple ways. First, upon appropriately reducing the wind data to surface values, these data will be used to refine our developmental dataset of RMW, R34, R50, and R64 for model development in Section C2c. Second, the flight-level data will be used to improve initial conditions for forecasts with any of the models proposed here. Finally, since flight-level data can depict important details of internal structure that cannot be captured as well by the data described in Section C2c, a DRVM model incorporating flight-level data and VDM structure predictors (e.g., Vigh et al. 2012) will be developed. This aircraft data-enhanced DRVM will be evaluated against the baseline models.

e. Incorporation of microwave predictors

It is anticipated that DRVM models incorporating GOES-IR imagery will add forecast skill to the prediction of TC wind structure. However, GOES-IR imagery often cannot discern the details of latent heating structures as accurately as passive microwave imagery (MI) provided by

low Earth orbiting satellites, yet latent heating is quite important for the evolution of a TC's wind field. Despite the low temporal coverage of MI data, MI-based predictors have proven significantly helpful in improving statistical TC models (e.g., Rozoff et al. 2012). As such, we propose to develop a DRVM augmented by MI-based predictors.

We currently possess a developmental dataset of multi-channel brightness temperatures from SSMI, SSMI/S, AMSR-E, AMSU-B, and TRMM-TMI to develop the MI-based DRVM and have a real-time data stream of SSMI, SSMI/S, AMSU-B, and TRMM-TMI from NESDIS that can continue to be utilized for this proposed project. Through coordination with JHT staff, we will work to make these data available on the operational NCEP Central Computing System (CCS) for use in real-time experiments with the MI-based DRVM.

f. Real-time Testing and Possible Improvements

If supported, experimental real-time testing will be completed for the Atlantic and Eastern Pacific hurricane seasons of 2013 and 2014. An ensemble of SRVMs and DRVMs using the various aforementioned datasets will be available. In addition, ensemble simulations that allow variance in model parameters will be carried out to account for uncertainties in the observational input and track and intensity forecasts. This probabilistic component of our parametric modeling system will provide end-users a degree of forecast uncertainty. If successful, this model could also be used to improve the wind structure information in NHC's operational wind speed probability program by replacing the simple DRCL model that is used to represent storm structure. Preliminary work has shown promising predictability in the statistical estimation of TC size change. As such, the implementation of the proposed modeling framework has the potential to significantly enhance the NHC's arsenal of forecast tools related to wind field prediction and storm surge predictions.

g. References

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C3. Work Plan

In year 1, the various versions of the SRVM and DRVM with lead times out to 120 h will be developed. These models will be run for both the Atlantic and Eastern Pacific basins and will include: a) a basic SRVM version that closely mirrors DRCL, b) SRVM and DRVM versions that include both dynamical and satellite (IR) predictors from SHIPS, c) a DRVM version that additionally incorporates predictors derived from aircraft-based data, and d) a DRVM enhanced with microwave-based predictors. Based on experience gained during the real-time testing in year 1, further refinements will be made to the research versions of these four model sets. CIRA will assist with the real-time implementation of the wind structure prediction, and the provision of a simpler baseline model for comparison. The large-scale predictors and GOES data are available as part of the SHIPS model prediction, so the wind structure model can be incorporated and run in that software infrastructure (primarily Fortran90). If supplemental input such as aircraft and microwave data are utilized, coordination with the JHT will be needed to make these data available on the NCEP CCS. A parallel version of SHIPS is also run at CIRA, so preliminary testing may occur in that environment, with the text output made available to NHC through a public ftp server. Additional prototype graphical visualizations of the SRVM/DRVM output, along with output from the dynamical model suite, will provided via the Tropical Cyclone Guidance Project at NCAR.

In year 2, the most skillful version of the above four models will be extended to provide predictions of significant wind radii out to 168 h. This candidate version of the potential operational model will be run on the NCEP CCS in real-time during the hurricane season. ***This candidate DRVM model will be incorporated directly into the SHIPS code set, with output being delivered in the operational SHIPS output files as experimental structure output.*** The radii values will also be provided in ATCF a-deck format. Additional research versions will

continue to run on CIRA computers in Fort Collins, CO. During year 2, we will also explore the potential to further improve the accuracy of DRVM's structure prediction by using an ensemble of DRVM models running from the various regional and global dynamical models. After the second season of testing and evaluation, a final version of DRVM code will be completed and delivered to the NCEP computer as part of an upgraded SHIPS code set. The timeline for all deliverables is set forth below in section C4.

Individual Roles

Both CIMSS/UW-Madison and NCAR will be the lead organizations in the proposed effort, providing overall scientific leadership through the two co-PIs.

Dr. Christopher Rozoff will be the Co-PI at CIMSS (0.29 FTE per year). He will have primary responsibility for the design and refinement of the empirical-dynamical prediction model. He will provide predictors derived from satellite GOES IR and microwave data. He will also assist the NCAR co-PI in deriving additional structure predictors from the full aircraft flight-level data and global model fields.

Dr. Jonathan Vigh will be the Co-PI at NCAR (0.29 FTE per year). He will have primary responsibility for providing predictors (e.g. RMW) from the aircraft datasets, via the VDMs and the full flight level data. He will contribute model-based predictors from the global and regional model fields and undertake verification and evaluation of the model output. He will design visualizations of the real-time output of the research model along with comparative metrics from other models. These visualizations will be posted to a project web site to be hosted at NCAR. Finally, he will be responsible for dissemination of datasets according to the data/information sharing plan. He will assist the CIMSS co-PI with model refinement.

Ms. Barb Brown will be a co-sponsored (0.03 FTE per year; NSF base funds) Co-I at NCAR. Her role will be to provide input and advice on the verification and evaluation effort.

Dr. Renate Brummer will be a Co-I at CIRA who directly oversees work on the effort to transition the research model to operations. The output of the research models and the prototype operational model will be posted on a website hosted by CIRA.

Dr. John Knaff and Dr. Mark DeMaria will be co-sponsored (NOAA base funds) Collaborators at NOAA. With their eminent experience in the design and building of real-time empirical-dynamical models as well as wind structure analyses, they will provide technical and scientific advice to the effort. They will also contribute related codes/output (e.g., baseline wind structure models) and help guide the effort to transition the research model to operations.

Data/Information Sharing Plan

A number of unique development data sets will be generated by the project. Each of these development data sets will be shared publicly via project web site(s) to be hosted at NCAR and/or CIRA. Real-time predictor data will also be shared on these project web sites. Documentation will be posted describing the content, format, and metadata for each of the respective types of data. Information about data provenance and stewardship will also be

provided. CIRA has a longstanding history of providing data sets, such as the SHIPS development data set and the Extended Best Track. The data sharing from this project will meet or exceed the standards of past projects.

C4. Timeline for Deliverables and Documentation

Aug 2013	Begin project
Sep 2013- Mar 2014	Complete development of initial non-microwave- and non-aircraft-based versions of the SRVM and DRVM models (3 models in total) at lead times out to 120-h
Sep - Nov 2013	Perform real-time tests of initial research models on the CIRA servers
Feb – May 2014	Refine research models, including versions that incorporate microwave and aircraft predictors; conduct retrospective tests; perform extensive evaluation
Mar 2014	Present year 1 results at the IHC
May 2014	Complete candidate operational version of DRVM out to lead times of 168- h; complete coding to incorporate model as part of the SHIPS/LGEM guidance suite on the operational NCEP CCS
Jun-Nov 2014	Conduct real-time testing of the candidate operational version; conduct real-time testing of refined research versions
Feb 2015	Complete evaluation of operational and research models
Mar 2015	Present year 2 results at IHC
Jun 2015	Complete development and evaluation of an ensemble version of DRVM
Jul 2015	Provide final code for operational DRVM to NHC for use in running new structure guidance on the NCEP CCS as part of the operational guidance suite (168-h version to be provided subject to NHC interest and demonstration of skill at the extended lead times; otherwise 120-h version will be provided)

C5. Schedule and Needs for Expected Travel

Spring 2014	NCAR PI travels to the Interdepartmental Hurricane Conference
Spring 2015	CIMSS PI travels to the Interdepartmental Hurricane Conference

C6. JHT Staff Requirements

No significant JHT staffing need is anticipated in year 1, since the research models will run as part of the SHIPS/LGEM guidance package on NESDIS servers in Fort Collins, CO. If the microwave and aircraft predictors show significant promise, as we expect, then JHT staffing will likely be needed in year 2 to help make the microwave and aircraft data available on the NCEP CCS.

D. Budget

This is a collaborative project between CIMSS, NCAR, CIRA, and NOAA/NESDIS. The total combined budget for request from all four agencies is $106,147 for year 1 and $108,174 in year 2. The break down for each of these agencies by year is provided below with the CIMSS budget provided first, followed by the NCAR and CIRA budgets. No NOAA/NESDIS budget is requested, as their contributions will be co-sponsored time of Dr. Mark DeMaria and Dr. John Knaff.

MASTER BUDGET				
Budget for Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution				
Year 1: 08/1/2013 - 07/31/2014				
	UW / CIMSS	**NCAR**	**CIRA / CSU**	**CUMULATIVE**
a. Personnel	$19,627	$19,416	$7,195	**$46,238**
b. Fringe Benefits	$8,047	$10,329	$1,804	**$20,180**
c. Travel	$0	$1,608	$0	**$1,608**
d. Equipment	$0	$0	$0	**$0**
e. Supplies	$0	$250	$0	**$250**
f. Contractual	$0	$0	$0	**$0**
g. Construction	$0	$0	$0	**$0**
h. Other	$0	$3,735	$232	**$3,967**
i. Total Direct Charges	$27,674	$35,338	$9,231	**$72,243**
j. Indirect Charges	$13,975	$17,160	$2,769	**$33,904**
k. TOTALS	$41,649	$52,498	$12,000	**$106,147**

MASTER BUDGET				
Budget for Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution				
Year 2: 08/1/2014 - 07/31/2015				
	UW / CIMSS	**NCAR**	**CIRA / CSU**	**CUMULATIVE**
a. Personnel	$20,020	$20,193	$7,175	**$47,388**
b. Fringe Benefits	$8,208	$10,743	$1,836	**$20,787**
c. Travel	$1,220	$0	$0	**$1,220**
d. Equipment	$0	$0	$0	**$0**
e. Supplies	$0	$250	$0	**$250**
f. Contractual	$0	$0	$0	**$0**
g. Construction	$0	$0	$0	**$0**
h. Other	$0	$3,735	$220	**$3,955**
i. Total Direct Charges	$29,448	$34,921	$9,231	**$73,600**
j. Indirect Charges	$14,871	$16,934	$2,769	**$34,574**
k. TOTALS	$44,319	$51,855	$12,000	**$108,174**

MASTER BUDGET				
Budget for Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution				
Cumulative: 08/1/2013 - 07/31/2015				
	UW / CIMSS	**NCAR**	**CIRA / CSU**	**CUMULATIVE**
a. Personnel	$39,647	$39,609	$14,370	**$93,626**
b. Fringe Benefits	$16,255	$21,072	$3,640	**$40,967**
c. Travel	$1,220	$1,608	$0	**$2,828**
d. Equipment	$0	$0	$0	**$0**
e. Supplies	$0	$500	$0	**$500**
f. Contractual	$0	$0	$0	**$0**
g. Construction	$0	$0	$0	**$0**
h. Other	$0	$7,470	$452	**$7,922**
i. Total Direct Charges	$57,122	$70,259	$18,462	**$145,843**
j. Indirect Charges	$28,846	$34,094	$5,538	**$68,478**
k. TOTALS	$85,968	$104,353	$24,000	**$214,321**

CIMSS Budget: Empirical-Dynamical Modeling of Tropical Cyclone Structure Evolution

Year 1

08/1/2013 - 07/31/2014

		Hours	Rate	Salary	Fringe	Cost	Totals
I.	Labor and Fringe Benefits						
	C.Rozoff - PI	518	37.89	$ 19,627	$ 8,047	$ 27,674	
	Subtotal						$27,674
II.	Travel						0
III.	Materials and Supplies						0
IV.	Publication 15 pages @ $140 each page						0
V.	University Indirect Cost at 50.5%						13,975
	TOTAL						$41,649

CIMSS Budget: Empirical-Dynamical Modeling of Tropical Cyclone Structure Evolution

Year 2

08/1/2014 - 07/31/2015

		Hours	Rate	Salary	Fringe	Cost	Totals
I.	Labor and Fringe Benefits						
	C.Rozoff - PI	518	38.65	$ 20,020	$ 8,208	$ 28,228	
	Subtotal						$28,228
II.	Travel						
	1 Trip/1 person/3 days/ Interdepartmental Hurricane Conference						1,220
III.	Materials and Supplies						0
IV.	Publication 15 pages @ $140 each page						0
V.	University Indirect Cost at 50.5%						14,871
	TOTAL						$44,319

CIMSS Budget: Empirical-Dynamical Modeling of Tropical Cyclone Structure Evolution

Budget Summary
Year 1 - 2
08/1/2013 - 07/31/2015

		Hours	Salary	Fringe	Cost	Totals
I.	Labor and Fringe Benefits					
	C.Rozoff - PI	1036	39,647	16,255	$ 55,902	
	Subtotal					$55,902
II.	Travel					
	1 Trip/1 person/3 days/ Interdepartmental Hurricane Conference					1,220
III.	Materials and Supplies					0
IV.	Publication					0
V.	University Indirect Cost at 50.5%					28,846
	TOTAL					$85,968

UW-Madison / CIMSS

Travel Costs

When	# of Travelers	Purpose	Destination	Travel Days	Airfare [$]	Meals/Day [$/day]	Motel/Day [$/day]	Rental Car (incl. Gas) [$/day]	Other Transport (Metro) [$/day]	Total [$]	Number of Trips	Total Cost
Year 2	1	Interdepartmental Hurricane Conference	TBD	3	500	40	150	50	0	1,220	1	**1,220**
											Total	**1,220**

Budget Justification

We request a total dollar amount of $85,968 for the period 1 August 2013 to 31 July 2015 to fund the research outlined in the proposal narrative. Explanations of the budget information are given directly below. The costs to conduct the activities described in this proposal are summarized in the budget pages provided. Cost estimates in these budget pages are based on historical events and experience.

Personnel

The following individuals have been identified as key personnel to this proposal:

Christopher Rozoff, Co-PI, 1036 hours

Time quoted for key personnel is the total amount of anticipated effort required to complete the proposed effort over the life of the project, including during periods of no cost extension. All effort for key persons will be sponsor paid effort. Fulfillment of the effort commitment will be defined as a total for the entire project period. We cannot guarantee effort for key personnel commitments per budget period given the uncertain volatile nature of research and funding availability. Funding reductions will result in a scaled back effort; the project narrative, the budget, and key personnel obligations will all be reduced in the same manner (i.e. if the funding is cut 25%, we will cut 25% of the project narrative and 25% of the labor and cost involved) unless otherwise negotiated.

This section identifies the staff required and their time commitment (hours needed) to conduct this proposed work. Salary information is provided in the SF424A and the UW-Madison Excel budget sheets. To calculate hourly rates for salaried employees, the formula is Total Salary divided by billable hours. Hourly rates are calculated using a base of 1,350 billable hours per year for Faculty and 1,750 billable hours for Academic Staff. The base for research interns, research associates, and graduate students is 1800 billable hours. Undergraduates are paid on an hourly basis, so no computation is required. Vacation, holiday and sick leave time is not charged directly to the projects. For budgets with duration greater than one year, we use a 2% inflation factor to labor rates to account for cost of living adjustment. To achieve the goals of this proposal, we estimate an approximate total effort at CIMSS as follows:

			Year 1		Year 2	
Name	Title	Classification	Hours	% Effort	Hours	% Effort
Rozoff, Christopher	Co-Principal Investigator	Academic Staff	518	29.6	518	29.6

Participant Activity Summary

Christopher Rozoff as Co-PI will oversee all project activities and reporting, and will be responsible for algorithm development and evaluation work at CIMSS.

Fringe Benefits

Fringe rates are dependent on employee classification (which is listed under the Personnel section). Please see the below table for a detailed summary of how the fringe benefit rate is calculated at the University of Wisconsin-Madison:

Components of the 2012-2013 Fringe Benefit Rate

Benefit Category	**Faculty & Academic Staff**	**Classified Staff**	**LTE**	**#1**	**#2**	**#3**	**#4**	**Student Hourly**
Income Continuation	0.2	0.2						
Unemployment Compensation	0.1	0.2	1.9					
Worker's Compensation	0.2	0.2	0.2					
Social Security	5.6	6.0	6.2	5.3		5.8		2.1
Medicare	1.4	1.4	1.4	1.2		1.4		0.5
Health Insurance	19.5	32.9	5.0	19.0	28.0		16.2	
Life Insurance	0.1	0.1						
Retirement	15.4	15.4	3.3					
Prior Year Adjustments	4.3	5.4	2.0	1.2	2.0	1.9	1.6	(0.3)
Adjustment for Actuals	(5.8)	(5.8)			(2.0)			
Totals	**41.0%**	**56.0%**	**20.0%**	**26.7%**	**28.0%**	**9.1%**	**17.8%**	**2.3%**

#1 Research Associates and Grad Interns
#2 Research Assistants, Project, and Teaching Assistants, Pre-Doc Fellows and/or Trainees
#3 Ad Hoc Program Specialists, Undergraduate Assistants and Undergraduate Interns
#4 Post-Doc Fellows and/or Trainees

Travel

Travel costs are for UW-Madison staff to attend meetings, workshops and professional conferences. The travel budgets in this proposal are based on recent history regarding the amount of travel needed to support the research project, interact with collaborators, and present results. The SSEC travel office monitors current airfares, hotel costs, car rentals, taxi fares, etc. and provides estimates for travel costs for frequent meeting sites. The UW-Madison, in accordance with Wisconsin state law, reimburses actual travel costs for hotel and meal expenses up to a certain maximum rate. All travel must be approved by the SSEC/CIMSS administration. Travel costs are reviewed by the SSEC travel office and one of the SSEC Executive Directors. Travel is requested in the second year for the Co-PI to attend the Interdepartmental Hurricane Conference, for a total cost of $1,220.

When	# of Traveler	Purpose	Destination	Travel Days	Airfare [$]	Meals/Day [$/day]	Motel/Day [$/day]	Rental Car (incl. Gas) [$/day]	Other Transport (Metro) [$/day]	Total [$]	Number of Trips	Total Cost
Year 2	1	Interdepartmental Hurricane Conference	TBD	3	500	40	150	50	0	1,220	1	1,220
											Total	1,220

University Indirect Cost, currently at 50.5%, is directly negotiated with the U.S. government and is charged to all budget items except capital equipment purchases over $5,000 and student tuition remission, which are free of Indirect Cost. The first $25,000 of a subcontract award is subject to university Indirect Cost, any award above $25,000 is free of Indirect Cost.

NCAR Division:		**RAL**						
Project Title:	**Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution**							
NCAR PI(s):		**Jonathan Vigh**						
NCAR Proposal #		**2013-1077**						
Period of Performance:		**8/1/13**	**-**	**7/31/15**				
Date:	**11/26/12**							
Initials:	**SB**					**YEAR 1**	**YEAR 2**	**TOTALS**
						Prime Agency	**Prime Agency**	**Prime Agency**
						Funding Agency	**Funding Agency**	**Funding Agency**
SALARIES & BENEFITS				**% Effort or FTE**				
Regular Salaries				**Prime Agency**	**Prime Agency**			
PROJ SCIENTIST I				29%	29%	19,416	20,193	39,609
RAL PROG DIR				0%	0%	0	0	0
SUBTOTAL Regular Salaries						**19,416**	**20,193**	**39,609**
TOTAL Salaries						**19,416**	**20,193**	**39,609**
Regular Benefits @			**0.532**			**10,329**	**10,743**	**21,072**
MATERIALS & SUPPLIES								
Materials General (5260)						250	250	500
SUBTOTAL						**250**	**250**	**500**
TRAVEL								
Domestic						1,608	0	1,608
SUBTOTAL						**1,608**	**0**	**1,608**
SUBTOTAL Modified Total Direct Costs (MTDC)						**31,603**	**31,186**	**62,789**
NCAR INDIRECT COSTS (IC) @			**0.543**			**17,160**	**16,934**	**34,094**
MTDC Items that include IC								
COMPUTING SERVICE CENTER						3,735	3,735	7,470
TOTAL MTDC + Applied IC						**52,498**	**51,855**	**104,353**
UCAR Management Fee								
(Applied to MTDC + IC)			**0.00**			**0**	**0**	**0**
TOTAL Funding to UCAR						**52,498**	**51,855**	**104,353**

NCAR Proposal 2013-1077 - Budget Justification

A) **Senior/Key Person Salaries, Wages and Fringe Benefits**
A Project Scientist I will serve as the Principal Investigator and charge approximately 29% time on this project with a salary range between $77,850.00 – $86,613.48. This labor will include (a) providing wind structure predictors (e.g. radius of maximum wind) from the aircraft datasets, via the Vortex Data Messages and the full flight level data; (b) deriving model-based predictors from the fields of global and regional models; (c) undertaking verification and evaluation of the empirical-dynamical model output; (d) designing visualizations of the real-time output of the research model along with comparative metrics from other numerical weather prediction models; (e) developing a project web site to be hosted at NCAR which will provide the predictor data, output visualizations from the research model, and verification metrics.

A RAL Program Director will co-sponsor approximately 3% time of her NSF base funds on this project. This labor will include providing input and advice on the evaluation methods used in the verification of the model.

There will be a 4% increase (approximate) in salary per year for all staff.

Labor Overhead
The salary budget includes a full time employee benefit rate of 53.2% for non-work time of vacation, sick leave, holidays and other paid leave, as well as standard staff benefits. Worked hours are based on 86% of 2080 hours in a year. The estimated rate increase per year is 4%.

B) **Other Personnel:** None

C) **Equipment:** None

D) **Travel:**
Domestic Travel: $1,608 is budgeted for domestic travel. This includes funds for a one-person, 5-day, 4-night trip to IHC (Orlando, FL) in March 2014.

Destination	Airfare	Hotel	Car	Per Diem	Conf. Reg & Misc	Total Trip Cost
Yr 1 - Travel - Trip One						
Denver, CO to Orlando, FL	$ 533.60	$ 666.00	$ -	$ 308.00	$ 99.95	$ 1,607.55
One Person						
5 Days						
Total for Yr 1 Travel	**$ 1,607.55**					

All costs (based on NCAR travel rates) include airfare, lodging, car rental, IRS-approved per diem rates, and registration costs and are escalated by 4% per year.

E) **Participant/Trainee Support Costs:** None

F) **Other Direct Costs:**
Materials and Supplies:
A total of $500 has been budgeted for Materials and Supplies and will include a conference registration fee and the printing of a conference poster for the Interdepartmental Hurricane Conference, phone charges for project team teleconferences, as well as office supplies, and miscellaneous postage and phone charges.

Purchased Services: None

Publication/Documentation/Dissemination Costs: None

Consultant Services: None

Computer Services: Scientific, computing and networking support costs have been allocated to this project through the Computer Service Center (CSC), in accordance with OMB circulars and NCAR management policy. The proposed CSC rate for FY2013 is $7.20 per labor hour.

G) **Direct Costs** - $70,259

H) **Indirect Costs -** $34,094
Indirect Costs are applied to all modified total direct costs (MTDC). Excluded from MTDC are items of equipment costing $5,000 or more, and individual subcontract amounts in excess of at least $25,000 per fiscal year. The approved FY2013 rate for Indirect Costs is 54.3%. Cognizant Agency: National Science Foundation.

I) **Total Direct and Indirect Costs**
Total amount of this request: $104,353

Standard Information:

1. The National Center for Atmospheric Research (NCAR) is operated by the University Corporation for Atmospheric Research (UCAR), DUNS# 078339587, under the sponsorship of the National Science Foundation (NSF). NSF, our cognizant audit agency, approves UCAR rates annually. Out year rates are estimated based on current rates and are subject to change. During certain time periods, budgets may include proposed rates, which are subject to review and approval of NSF.

2. The salary budget includes direct labor charges only for time worked. The employee benefit rate includes direct charges for non-work time of vacation, sick leave, holidays and other paid leave, as well as standard staff benefits. The casual benefit rate applies to casual employees who do not receive the full benefit package.

3. Indirect Costs are applied to all modified total direct costs (MTDC). Items excluded from MTDC are equipment costing $5,000 or more, participant costs, and individual subcontract amounts in excess of $25,000 per fiscal year.

4. The UCAR management fee is a fixed fee, calculated as a % of proposed MTDC and NCAR applied indirect costs.

5. The budget may include a charge for scientific computing and networking support in accordance with OMB circulars and NCAR management policy allocating the costs of scientific computing system infrastructure.

6. NSF Co-sponsorship is defined as the value of resources funded by NSF to NCAR through the UCAR cooperative agreement that contribute to the performance of research sponsored by another organization. NSF Co-sponsorship should not be viewed as cost sharing, as defined in OMB Circular A-110, as it is borne by the Federal Government.

7. Non-NSF and NSF Grant research at NCAR is monitored by our sponsor, the National Science Foundation, in accordance with criteria and guidelines approved by NSF/Division of Atmospheric Sciences.

8. For Federal Interagency Agreement Fund Transfers, NSF Administrative Cost recovery is applied at the current rate to total transfers. As a condition of NSF's entering into an interagency agreement or fund transfer, other Federal agencies must agree to the following conditions:

- NSF will implement the agreement by awarding a Cooperative Support Agreement (CSA), or by amendment to an existing, applicable CSA issued to the University Corporation for Atmospheric Research under Cooperative Agreement No. ATM-0753581, or any successor agreement.
- All fund transfers will be accepted and work performed under the terms and conditions of the Cooperative Agreement. NSF will not, itself, be directly responsible for the provision of the goods or services contemplated under NCAR's proposal to the other Federal Agency.
- NSF assumes no liability for any costs above the funds obligated against the Cooperative Support Agreement. .
- It is NCAR's responsibility to provide the necessary financial and technical reports to the sponsoring agency in accordance with the terms and conditions of the sponsoring agency's agreement.
- In accordance with NSF policy, a portion of the fund transfer will be set aside to recover costs that NSF incurs in the management, administration and oversight of the funded activities at a rate determined by NSF.

For funds provided by federal interagency agreement or fund transfer with NSF, the contact is, Ms. Kristin Spencer, Grant and Agreement Specialist, Division of Acquisition and Cooperative Support, National Science Foundation, 4201 Wilson Boulevard, Room 475 S, Arlington, VA 22230. Phone (703) 292-4585, Fax (703) 292-9141. If a proposal was written with the expectation of being funded by interagency transfer, the total funds requested include funds to cover NSF's administrative costs, based on NSF's current rate, related to undertaking this activity. The following language should be included in the interagency transfer documentation: "This agreement includes funds to cover NSF's administrative costs related to undertaking this activity." Please refer to NCAR's proposal number on all correspondence with NSF.

For funds provided by direct agreement with UCAR, contractual arrangements should be made with Ms. Virginia Taberski, Manager of Sponsored Agreements, UCAR Sponsored Agreements, 1850 Table Mesa Drive, Boulder, CO 80305, Phone (303) 497-2132, Fax (303) 497-8501. Please refer to NCAR's proposal number on all correspondence with UCAR.

Rate Letter FY13

UNIVERSITY CORPORATION FOR ATMOSPHERIC RESEARCH
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH ♦ UCAR OFFICE OF PROGRAMS

Melissa D. Miller
Director
Budget and Finance
P.O. Box 3000 ♦ Boulder, CO 80307
303/497-8575 ♦ fax: 303/497-8579
melissa@ucar.edu

September 20, 2012

Mr. Charles Zeigler
Cost Analysis and Audit Resolution Branch
Division of Institution and Award Support (BFA/DIAS)
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Mr. Zeigler:

Enclosed is the FY2013 UCAR Indirect Cost Rate Proposal. The UCAR President's Council reviewed indirect cost pool budgets and rates on June 13, 2012 and provided final decisions on July 5, 2012. The additional time to develop the indirect cost rate proposal was very much appreciated.

We appreciate the cooperation of DIAS, DACS, and AGS in this process and look forward to discussing any questions you may have regarding the proposal.

Sincerely,

Melissa D. Miller
Director, Budget and Finance

c: K. Spencer (NSF)
S. Nelson (NSF)
L. Dash (NSF)
J. Young
J. Reaves
D. Wilson
R. Brasher-Alleva
C. Huddle
C. Chambers
G. Taberski
K. Alipit

UCAR President's Council:
T. Bogdan
M. Hagan
H. Mauriello
R. Wakimoto
K. Schmoll

University Corporation for Atmospheric Research
FY2013 Summary of Indirect Cost Rates

	FY2011 Actual	FY2012 Proposed	FY2013 Proposed
Employee Benefit, Indirect Cost Rates:			
Reduced Benefit Rate	8.2%	8.0%	9.6%
Full Benefit Rate	51.6%	50.7%	53.2%
Communications Indirect Cost Rate	$2,873	$2,991	$2,920
Facilities Indirect Cost Rate	$23.19	$24.06	$26.92
UCAR G&A Indirect Cost Rate	13.7%	13.4%	14.4%
NCAR Indirect Cost Rates:			
On-Site	50.5%	50.5%	54.3%
Off-Site/NWSC	n/a	37.0%	39.8%
UCP Indirect Cost Rates:			
On-Site	32.2%	30.0%	31.6%
Off-Site/Visitor Program	20.7%	19.1%	21.1%

NCAR
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

OFFICE OF THE DIRECTOR

September 20, 2012

Mr. Charles D. Zeigler
Team Lead
Cost Analysis and Audit Resolution Branch
Division of Institution and Award Support
(BSA/DIAS)
Room 485-N
National Science Foundation
4201 Wilson Blvd.
Arlington, VA 22230

Dear Mr. Zeigler,

Enclosed for review and approval are UCAR's proposed **FY2013 Aircraft Maintenance Rates (AMR), Service Center Rates (CSC and Machine Shop) and System User Rates (SUR and GAU).**

The Earth Observing Laboratory's System User Rates (SUR) and the NCAR Earth System Laboratory's Mesoscale and Microscale Meteorology Division Computer Service Center (CSC) rate will not change from FY2012. We propose rate changes to all the remaining rates for FY2013.

One change of note is the Computational and Information Systems Laboratory's (CISL) proposed General Accounting Unit (GAU) rate decrease from $0.44 per hour in FY 2012 to $0.017 per hour or $1.661 per 100 GAU hours in FY2013. This change reflects the recent procurement of the Yellowstone 1.5-petaflops high-performance computing system. With this acquisition, computing will increase by a factor of 33.4 which will significantly decrease the cost per GAU.

As with previous rate submissions, the attached summary page has an approval line for the NCAR/Facilities Section Head signature. If you have any questions regarding the FY2013 proposed rates, please give me a call at (303) 497-1116 or you can reach me at rena@ucar.edu.

Sincerely,

Rena Brasher-Alleva
NCAR Budget & Planning Director

cc: L. Avallone, L. Dash, S. Nelson, K. Spencer; NSF
UCAR President's Council
Center Administrators
K. Alipit, C. Chambers, R. Greenberg, M. Miller, J. Reaves, G. Taberski, J. Young

National Center for Atmospheric Research
Boulder, Colorado
FY 2013 Approved Rate Summary

1. Aircraft Maintenance Rate

Aircraft Maintenance Rate (AMR)	FY 2011 Actual	FY 2012 Approved	FY 2013 Proposed
C-130 Aircraft	$613 /Hour	$516 /Hour	$530 /Hour
GV Aircraft (Gulfstream HIAPER)	$238 /Hour	$1,201 /Hour	$1,315 /Hour

2. Service Center Rates

Division Computing Service Centers	FY 2011 Actual	FY 2012 Approved	FY 2013 Proposed
Climate and Global Dynamics (CGD)	$6.43 /Hour	$6.49 /Hour	$6.40 /Hour
Atmospheric Chemistry Division (ACD)	$5.13 /Hour	$4.80 /Hour	$5.90 /Hour
High Altitude Observatory (HAO)	$6.41 /Hour	$6.62 /Hour	$6.93 /Hour
Mesoscale & Microscale Meteorology (MMM)	$6.56 /Hour	$6.50 /Hour	$6.50 /Hour
Research Applications Laboratory (RAL)	$7.09 /Hour	$7.18 /Hour	$7.20 /Hour
Machine Shop			
Machine Shop Rate	$73 /Hour	$74 /Hour	$77 /Hour

3. System User Rates

Earth Observing Laboratory (EOL)	FY 2011 Actual	FY 2012 Approved	FY 2013 Proposed
Systems User Rates (SUR)			*(Unchanged)*
ISFF	$758 /Day	$674 /Day	$674 /Day
ISS	$508 /Day	$467 /Day	$467 /Day
Dropsonde Data System	$2,689 /Day	$2,736 /Day	$2,736 /Day
ELDORA	$1,100 /Day	$2,135 /Day	$2,135 /Day
S-Pol Radar	$10,787 /Day	$9,132 /Day	$9,132 /Day
C-130 Aircraft	$15,411 /Day	$11,738 /Day	$11,738 /Day
Gulfstream Aircraft (HIAPER)	$14,589 /Day	$10,759 /Day	$10,759 /Day
Mechanical Design	$1,022 /Day	$923 /Day	$923 /Day
Machine Shop	$167 /Day	$106 /Day	$106 /Day

Comp. & Information Systems Lab (CISL)	FY 2011 Actual	FY 2012 Approved	FY 2013 Proposed
	(Unchanged)	*(Unchanged)*	
General Accounting Unit (GAU)	$0.44 /Hour	$0.44 /Hour	$0.017 /Hour
GAU Rate per 100 GAUs	N/A	N/A	$1.661 /100 Hours

APPROVED:

Stephen P. Nelson, Ph.D.
Section Head
NCAR/Facilities Section

Date

University Corporation for Atmospheric Research
National Center for Atmospheric Research
FY 2013 Proposed Aircraft Maintenance Rates (AMR)

Aircraft Maintenance Rates (AMR)	Actual FY 2011	Approved FY 2012	Proposed FY 2013
C-130 Aircraft			
Operating Expenses	$100,589	$103,218	$106,005
Number of Hours	164	200	200
C-130 AMR Rate/Hour	**$613**	**$516**	**$530**

Note (1): Actual aircraft flight hours are dependent on OFAP approved deployments and the deployment schedule.

G-V Aircraft Maintenance Rate (AMR)	Actual FY 2011	Proposed FY 2012	Proposed FY 2013
Operating Expenses	$52,246	$300,242	$328,739
Number of Hours	220	250	250
G-V Rate/Hour	**$238**	**$1,201**	**$1,315**

Note (1): Many of these hourly expenses have a lifecycle in excess of a year; therefore, yearly actual rates are not relevant. Note (2): Beginning in FY 2012, an engine service contract was initiated so that virtually all engine costs are covered, not just the hot-section or full overhaul. This acounts for the increase in this component and the overall rate. Note (3):The GV's component AMRs have been updated with the latest cost information from industry and incorporate EOL's growing experience with operating the aircraft.

University Corporation for Atmospheric Research
National Center for Atmospheric Research
FY 2013 Proposed Service Center Rates

Computing Service Centers (CSC)	Actual FY 2011	Approved FY 2012	Proposed FY 2013
Climate & Global Dynamics			
Operating Expenses	$1,077,117	$1,071,914	$1,246,965
Worktime Hours	167,632	165,164	194,969
CGD CSC Rate/Hour	**$6.43**	**$6.49**	**$6.40**
Atmospheric Chemistry Division			
Operating Expenses	$756,330	$651,256	$796,390
Worktime Hours	147,343	135,782	134,912
ACD CSC Rate/Hour	**$5.13**	**$4.80**	**$5.90**
High Altitude Observatory			
Operating Expenses	$695,913	$708,835	$733,349
Worktime Hours	108,507	107,033	105,768
HAO CSC Rate/Hour	**$6.41**	**$6.62**	**$6.93**
Mesoscale & Microscale Meteorology			
Operating Expenses	814,524	774,281	841,908
Worktime Hours	124,085	119,103	129,494
MMM CSC Rate/Hour	**$6.56**	**$6.50**	**$6.50**
Research Applications Laboratory			
Operating Expenses	$2,312,687	$2,592,487	$2,237,625
Worktime Hours	326,353	360,953	310,969
RAL CSC Rate/Hour	**$7.09**	**$7.18**	**$7.20**
Machine Shop			
Operating Expenses[1]	$1,006,311	$1,050,214	$991,280
Number of Hours	13,714	14,124	12,867
Machine Shop Rate/Hour	**$73**	**$74**	**$77**

[1]*FY11 anticipated operating expenses are increasing primarily due to the addition of 2 machinists to meet growing demand.*

University Corporation for Atmospheric Research
National Center for Atmospheric Research
FY 2013 Proposed System User Rates

Earth Observing Laboratory (EOL)	Actual FY 2011	Approved FY 2012	Proposed FY 2013
Systems User Rates (SUR)			
ISFF			
Operating Expenses	$1,774,565	$1,752,986	$1,752,986
Number of Systems	9	10	10
Number of Days[2]	260	260	260
ISFF Rate/Day[3]	**$758**	**$674**	**$674**
ISFF is a combination of the previous ASTER facility and the enhanced PAM III facility.			
ISS/GLASS/GAUS			
Operating Expenses	$1,057,545	$1,213,998	$1,213,998
Number of Systems	8	10	10
Number of Days[2]	260	260	260
ISS Rate/Day[3]	**$508**	**$467**	**$467**
ISS / GLASS / GAU combined in FY 2007.			
Dropsonde Data System			
Operating Expenses	$1,398,026	$1,422,837	$1,422,837
Number of Systems	2	2	2
Number of Days[2]	260	260	260
Dropsonde Data System Rate/Day[3]	**$2,689**	**$2,736**	**$2,736**
ELDORA			
Operating Expenses	$285,908	$555,001	$555,001
Number of Systems	1	1	1
Number of Days[2]	260	260	260
ELDORA Rate/Day[3]	**$1,100**	**$2,135**	**$2,135**

University Corporation for Atmospheric Research
National Center for Atmospheric Research
FY 2013 Proposed System User Rates

S-Pol Radar[1]			
Operating Expenses	$2,804,650	$2,374,284	$2,374,284
Number of Systems	1	1	1
Number of Days[2]	260	260	260
S-Pol Rate/Day[3]	**$10,787**	**$9,132**	**$9,132**
C-130 Aircraft			
Operating Expenses	$4,006,934	$3,051,858	$3,051,858
Number of Days[2]	260	260	260
C-130 Aircraft Rate/Day[3]	**$15,411**	**$11,738**	**$11,738**
GV (HIAPER) Gulfstream Aircraft			
Operating Expenses	$3,793,058	$2,797,322	$2,797,322
Number of Days[2]	260	260	260
	$14,589	**$10,759**	**$10,759**
Mechanical Design			
Operating Expenses	$724,031	$821,862	$821,862
Number of FTEs	2.7	3.4	3.4
Number of Days[2]	260	260	260
Mechanical Design Rate/Day[3]	**$1,022**	**$923**	**$923**
Machine Shop			
Operating Expenses	$360,230	$235,224	$235,224
Number of FTEs	8.3	8.6	8.6
Number of Days[2]	260	260	260
Machine Shop Rate/Day[3]	**$167**	**$106**	**$106**
This represents an add on user rate for non-NSF users, for recovery of base funded supervisory and support staff.			

[1] *Changes in S-Pol SURs primarily driven by fluctuations in OFAP approved yearly deployment and planned usage of the facility.*

[2] *For all SUR rates, the number of working days in a year is 5 days per week for 52 weeks in a year, per NSF-AGS.*

[3] *For all SUR rates, duration and complexity of field programs may affect the required size of the base funded field crew. Subject to NSF Program Official and Grants and Agreements Officer approval, the SUR can be adjusted to reflect lower or higher labor requirements.*

Comp. & Information Systems Laboratory (CISL)	Actual FY 2011	Approved FY 2012	Proposed FY 2013
General Accounting Unit (GAU)			
Operating Expenses	$18,093,643	$18,093,643	$22,585,250
GAU Usage (Hours)	40,690,450	40,690,450	1,360,000,000
CISL GAU Rate/Hour	$0.44	$0.44	$0.017
CISL GAU Rate per 100 GAUs	N/A	N/A	$1.661

Notes (1) : With the most recent procurement, Yellowstone, occurring in FY12/FY13, computing has increased by a factor of 33.4 since FY2009, the last GAU Rate Submission increase. This increased the number of GAUs possible to generate, which has decreased the cost per GAU significantly.

CIRA / CSU

Budget for Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution
August 1, 2013 - July 31, 2014

			8/1/13 - 6/30/14			7/1/14 - 7/31/14		
I.	**PERSONNEL**		**Rate**	**mth**	**Cost**	**Rate**	**mth**	**Cost**
		Salaries						
	1	K. Micke	4,720	0.27	1,260	4,862	0.25	1,215
	2	R. DeMaria	3,906	0.27	1,043	4,023	0.25	1,005
	3	R. Brummer	10,558	0.15	1,584	10,874	0.10	1,087
		Subtotals			3,887			3,308
		Fringe Benefits						
	1	K. Micke	24.9%		314	25.3%		307
	2	R. DeMaria	24.9%		260	25.3%		254
	3	R. Brummer	24.9%		394	25.3%		275
		Subtotals			968			837
		Total Salaries and Benefits				**8,999**		
II.	**OTHER**							
	1	Computer Charges*	232					
		Total Other				**232**		
III.	**DIRECT COST**					**9,231**		
IV.	**INDIRECT COST (30% of I, and II)**					**2,769**		
V.	**TOTAL BUDGET**			Target: 12 K		**12,000**		

	***Computer Charges Calculations**	Rate	Mths	Totals
1	K. Micke	224	0.52	116
2	R. DeMaria	224	0.52	116
3	R. Brummer	0	0.25	0
			Total	232

	CIRA / CSU							
	Budget for Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution							
	August 1, 2014 - July 31, 2015							
			7/1/14 - 6/30/15			**7/1/15 - 7/31/15**		
I.	**PERSONNEL**		**Rate**	**mth**	**Cost**	**Rate**	**mth**	**Cost**
		Salaries						
	1	K. Micke	4,862	0.25	1,194	5,008	0.24	1,226
	2	R. DeMaria	4,023	0.25	988	4,144	0.24	1,015
	3	R. Brummer	10,875	0.15	1,631	11,201	0.10	1,120
		Subtotals			3,814			3,361
		Fringe Benefits						
	1	K. Micke	25.3%		302	25.9%		318
	2	R. DeMaria	25.3%		250	25.9%		263
	3	R. Brummer	25.3%		413	25.9%		290
		Subtotals			965			871
	Total Salaries and Benefits					**9,011**		
II.	**OTHER**							
	1	Computer Charges*			220			
		Subtotal			220			
		Total Other				**220**		
III.	**DIRECT COST**					**9,231**		
IV.	**INDIRECT COST (30% of I, and II)**					**2,769**		
V.	**TOTAL BUDGET**			Target: 12k		**12,000**		
	***Computer Charges Calculations**		Rate	Mths	Totals			
	1	K. Micke	224	0.49	110			
	2	R. DeMaria	224	0.49	110			
	3	R. Brummer	0	0.25	0			
				Total	220			

CIRA Budget Justification and Summary

Colorado State University's budget for 3 years of research is summarized below. Year 2 assumes the CSU-defined inflation factors (3% for salary, 5% all other categories).

I. PERSONNEL

The budget includes a request for 0.53 and 0.50 months of support each in Years 1 and 2 for CIRA Research Associates K. Micke and R. DeMaria to provide scientific computer support. R.Brummer, CIRA Senior Research Associate / Deputy Program Manager, oversees CIRA projects, supervises and directs CIRA personnel and manages the budget process at CIRA/CSU. She will coordinate this JHT project and prepare JHT reports. R. Brummer will work closely with Mark DeMaria from NOAA/NESDIS/StAR. Mark DeMaria and John Knaff (both Federal Employees with NOAA/NESDIS/StAR's RAMM Branch) are base-funded. They will make key scientific contributions to this project at no cost to JHT.

Salary: Base salaries included in this proposal reflect the actual salaries approved by the Governing Board of Colorado State University. Any salaries beyond the approved period are budgeted at a 3% increase over the prior year's annual base. CSU-defined fringe benefit rates have also been applied. All individuals budgeted are employees of Colorado State University.

Fringe Benefits: The following fringe rates were applied to the above salaries based on the individual's payroll classification:

	FY14	FY15	FY16
Faculty/Administrative Professional	24.9%	25.3%	25.9%
Student Hourly	1.0%	1.0%	1.0%

II. OTHER

Infrastructure: Computer Charges: The infrastructure fee provides for high-end computing capacity such as high speed network and associated equipment including 10G firewall, router, multiple subnets, DNS, DHCP, switches, and central computer rooms. The rate is determined by CIRA, applied to all Fort Collins, CO users and correlates to the actual costs of the above.

8/1/13 – 7/31/14 rates:			
K. Micke	224	0.52	116
R. DeMaria	224	0.52	116
R.Brummer	0	0.25	0
		Total	232
8/1/14 – 7/31/15 rates:			
K. Micke	224	0.49	110
R. DeMaria	224	0.49	110
R.Brummer	0	0.25	0
		Total	220

III. INDIRECT COST RATE

An Indirect Rate of 30% charged on this proposal is the negotiated rate for CIRA's Cooperative Agreement with NOAA effective July 1, 2009-June 30, 2014. The rate is applied to Modified Total Direct Costs (MTDC). MTDC is defined as Total Direct Costs less Equipment, GRA Tuition, and Subcontracts > $25,000. This rate was approved in amendment 0 of NA090AR4320074.

F. Curriculum Vita

Co-Principal Investigator, Christopher M. Rozoff
CIMSS/UW-Madison | 1225 West Dayton Street, Madison, WI 53706
(608) 512-5099 | chris.rozoff@ssec.wisc.edu

Dr. Christopher Rozoff (Co-PI) is an Associate Researcher at CIMSS with a decade of experience in tropical cyclone (TC) research. His earlier research dealt with ways to interpret inner-core dynamics using idealized models and these studies yielded insight into eyewall replacement cycles, convective processes in TCs, and the distribution of subsidence in the eye. Since then, he gained experience working with a number of observational datasets (in situ, reanalysis, and satellite data) and statistical models related to TC intensity and structure change. Also, the PI has worked extensively with WRF simulations of TCs.

Professional Preparation

UW-Milwaukee	Atmospheric Science, Mathematics	B.S. 1999
Colorado State University	Atmospheric Science	M.S. 2002
Colorado State University	Atmospheric Science	Ph.D. 2007

Appointments

2011-present	Associate Researcher, CIMSS/UW-Madison
2009-2011	Assistant Researcher, CIMSS/UW-Madison
2007-2009	Postdoctoral Fellow, CIMSS/UW-Madison
2000-2007	Graduate Research Assistant, Colorado State University
2003	Graduate Teaching Assistant, Colorado State University

Recent Publications

Sitkowski, M., J. Kossin, C. M. Rozoff, and J. Knaff, 2012: Hurricane eyewall replacement cycles and the relict inner eyewall circulation. *Mon. Wea. Rev.*, in press.

Monette, S. A., C. S. Velden, K. S. Griffin, and C. M. Rozoff, 2012: Examining trends in satellite-detected overshooting tops as a potential predictor of tropical cyclone rapid intensification. *J. Appl. Meteorol. Climatol.*, **51**, 1917-1930.

Rozoff, C. M., D. S. Nolan, J. P. Kossin, F. Zhang, and J. Fang, 2012: The roles of the expanding wind field and inertial stability in tropical cyclone secondary eyewall formation. *J. Atmos. Sci.*, **69**, 2621-2643.

Sitkowski, M., J. Kossin, and C. M. Rozoff, 2011: Intensity and structure changes during hurricane eyewall replacement cycles. *Mon. Wea. Rev.*, **139**, 3829-3847.

Rozoff, C. M., and J. P. Kossin, 2011: New probabilistic forecast models for the prediction of tropical cyclone rapid intensification. *Wea. Forecasting*, **26**, 677-689.

Other Relevant Publications

Rozoff, C. M., J. P. Kossin, W. H. Schubert, and P. Mulero, 2009: Internal control of hurricane intensity variability: The dual nature of potential vorticity mixing. *J. Atmos. Sci.*, **66**, 133-147.

Rozoff, C. M., W. H. Schubert, and J. P. Kossin, 2008: Some dynamical aspects of hurricane eyewall replacement cycles. *Q. J. R. Meteorol. Soc.*, **134**, 583-593.

Schubert, W. H., C. M. Rozoff, J. L. Vigh, B. D. McNoldy, and J. P. Kossin, 2007: On the distribution of subsidence in the hurricane eye. *Q. J. R. Meteorol. Soc.*, **133**, 595-605.

Rozoff, C. M., W. H. Schubert, B. McNoldy, and J. P. Kossin, 2006: Rapid filamentation zones in intense tropical cyclones. *J. Atmos. Sci.*, **63**, 325-340.

Recent Community Service

Associate Editor of *Monthly Weather Review*

Co-Principal Investigator, Jonathan L. Vigh
UCAR/NCAR/RAL | 3450 Mitchell Lane, Boulder, CO 80307
(303) 497-8205 | **jvigh@ucar.edu**

Dr. Jonathan Vigh (co-PI) is a Project Scientist I at the NCAR Research Applications Laboratory. His earlier research delved into ensemble prediction of tropical cyclone (TC) track using a reduced complexity barotropic model. In recent years, he has focused his research on various aspects of tropical cyclone (TC) structure and intensity change, with a particular emphasis on the changes that result during the initial formation of the TC eyewall. Through both theoretical investigation and the synthesis of a new dataset of aircraft-based structure and intensity parameters, these studies have yielded insight into the role of eyewall development in the subsequent intensification of the TC, the range of intensities at which eyes form, and the environmental conditions that favor eyewall formation. This work has also led to significant new knowledge of the behavior of the radius of maximum wind during eye formation. Since then, he has gained expertise in the area of terascale computing and model diagnostics by examining the spatial bias structure of the basin-scale HWRF model.

Professional Preparation

Colorado State University	Atmospheric Science	Ph.D. 2010
Colorado State University	Atmospheric Science	M.S. 2004
Penn State University	Meteorology	B.S. 2000

Appointments

2012-present	Project Scientist I, Research Applications Laboratory, NCAR
2010-2011	Postdoctoral Fellow, Advanced Study Program, NCAR
2000-2010	Graduate Research Assistant, Dept. of Atmospheric Science, Colorado State University
2003	Graduate Teaching Assistant (Introduction to Atmospheric Modeling, AT604), Dept. of Atmospheric Science, Colorado State University
1999	Undergraduate Teaching Assistant, Dept. of Meteorology, Penn State University
1997-1998	Teacher, Chuuk SDA High School, Weno, Federated States of Micronesia

Recent Publications

Frisius, T. D. Schönemann, and **J. Vigh**, 2012: The impact of gradient wind imbalance on potential intensity of tropical cyclones. *Submitted to the Journal of Atmospheric Sciences 08 June 2012, revised 06 November 2012*.

Musgrave, K.D., R. K. Taft**, J. L. Vigh**, B. D. McNoldy, and W. H. Schubert, 2012: Time evolution of the intensity and size of tropical cyclones. *J. Adv. Mode. Earth Syst.*, **4**, M08001, 15 pp., doi:10.1029/2011MS000104.

Vigh. J. L., J. A. Knaff, and W. H. Schubert, 2012: A climatology of hurricane eye formation. *Monthly Weather Review, **140**,* doi:10.1175/MWR-D-11-00108.1*, 1405-1426.*

Other Relevant Publications

Vigh. J. L. and W. H. Schubert, 2009: Rapid development of the tropical cyclone warm core. *Journal of the Atmospheric Sciences, **66***, doi:10.1175/2009JAS3092.1, 3335-3350.

Schubert, W. H. C. M. Rozoff, **J. L. Vigh**, B. D. McNoldy, and J. P. Kossin, 2007: On the distribution of subsidence in the hurricane eye. *Quarterly Journal of the Royal Meteorological Society,* **133**, doi:10.1002/qj.49, 595-605.

Recent Community Service
Referee, Monthly Weather Review
Referee, Journal of the Atmospheric Sciences
Proposal Referee, National Science Foundation

Dr. Vigh also initiated the Tropical Cyclone Guidance Project (TCGP) at NCAR's Research Applications Laboratory. This project has the broad aim of improving the dissemination of TC forecast guidance products around the world, as well as developing new forecast aids.

Biographical Sketch
Barbara G. Brown

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email: bgb@ucar.edu

a. Professional Preparation:

Colorado State University	Statistics	B.S.	1976
University of Virginia	Environmental Sciences	M.S.	1979
Oregon State University	M Statistics	M.S.	1983

b. Appointments:

2009 – present: Director, Joint Numerical Testbed (JNT) Program, Research Applications Laboratory (RAL), National Center for Atmospheric Research (NCAR). Lead a group of scientists and engineers linking operational and research communities to improve numerical weather prediction. Oversee testing and evaluation efforts and research to develop new forecast evaluation methods and tools.

1998 – 2009: Project Scientist, NCAR/RAL. Science Lead for Weather Systems and Assessment Program and leader of Forecast Verification Group, including about 12 scientists and software engineers. Alternate Lead for FAA Aviation Weather Research Program Quality Assessment Product Development Team.

1991 – 1998: Associate Scientist, NCAR/Research Applications Program (RAP). Lead of Verification Group.

1987-1991: Associate Scientist, NCAR, Environmental and Societal Impacts Group (ESIG).

1989 – 1990: Consultant, Space Environment Center, National Oceanic and Atmospheric Administration

1984 – 1986: Scientific Visitor, NCAR / ESIG.

1981 – 1989: Research Assistant, Department of Atmospheric Sciences, Oregon State University

1978 – 1980: Research Scientist, Institute of Atmospheric Sciences, South Dakota School of Mines and Technology

c. Publications

Brown, B.G. and A.H. Murphy, 1987: Quantification of uncertainty in fire-weather forecasts: Some results of operational and experimental forecasting programs. *Weather and Forecasting*, **2**, 190-205.

Murphy, A.H., B.G. Brown and Y.-S. Chen, 1989: Diagnostic verification of temperature forecasts. *Weather and Forecasting*, **4**, 485-501.

Davis, C., B. Brown, and R. Bullock, 2006: Object-based verification of precipitation forecasts, Part I: Methodology and application to mesoscale rain areas. *Monthly Weather Rev.,* **134**, 1772-1784.

Davis, C., B. Brown, and R. Bullock, 2006: Object-based verification of precipitation forecasts, Part II: Application to convective rain areas. *MWR*, **134**, 1785-1795.

Davis, C.A., B.G. Brown, R.G. Bullock and J. Halley Gotway, 2009: The Method for Object-based Diagnostic Evaluation (MODE) Applied to Numerical Forecasts from the 2005 NSSL/SPC Spring Program. *Wea. Forecasting*, **24**, 1252—1267.

Casati, B., L. J. Wilson, D. B. Stephenson, P. Nurmi, A. Ghelli, M. Pocernich, U. Damrath, E. E. Ebert, B. G. Brown, and S. Mason, 2008: Forecast verification: current status and future directions. *Met. Appl.*, **15**, 3-18.

Morss, R.E., J.K. Lazo, B.G. Brown, H.E. Brooks, P.T. Ganderton, and B.N. Mills, 2008: Societal and economic research and applications for weather forecasts: Priorities for the North American THORPEX program. *BAMS*, **89**, 335-346.

Gilleland, E., D. Ahijevych, B.G. Brown, B. Casati, and E.E. Ebert, 2009: Intercomparison of Spatial Forecast Verification Methods. *Wea. Forecasting*, **24**, 1416-1430

Gilleland, E., D.A. Ahijevych, B.G. Brown and E.E. Ebert, 2010: Verifying Forecasts Spatially. *Bull. Amer. Meteor. Soc.*, **91**, 1365-1373.

Brown, B.G., E. Gilleland, and E. Ebert, 2012: Forecasts of spatial fields. In *Forecast verification: A practitioner's guide* (I. Jolliffe and D. Stephenson, editors), Wiley, 292 pp.

d. Synergistic Activities

Member (current) and former chair (2002-2010), WMO Joint Working Group on Verification; Member, Scientific Steering Committee for the WMO World Weather Research Program

Organizer, Workshop 1^{st} – 5^{th} International Verification Methods Workshops (Boulder, 2002; Montreal, 2004; Reading, 2007; Helsinki, 2009; Melbourne, 2011); NCAR Advanced Studies Program Colloquium on Verification (2010)

Member and Chair, AMS Committee on Probability and Statistics in the Atmospheric Sciences (2009-present; Chair 2012-2014)

Member, National Research Council Committee on Communicating Uncertainty; co-author of report, "Completing the Forecast" (2006)

Fellow of the American Meteorological Society (2006)

e. Collaborators & Other Affiliations

- ***Collaborators and Co-editors***: D. Ahijevych (NCAR), H. Brooks (Nat. Severe Storms Laboratory), R. Bullock (NCAR), B. Casati (Ouranos, Canada), C. Davis (NCAR), E. Ebert (CAWCR, Australia), E. Gilleland (NCAR), J. Halley Gotway (NCAR), J. Lazo (NCAR), R. Morss (NCAR), P. Nurmi (Finnish Meteorological Institute), E. Tollerud (NOAA), L. Wilson (Environment Canada)
- ***Graduate advisors***: Joanne Simpson (deceased); Allan H. Murphy (deceased)

Abbreviated Curriculum Vitae For Renate Brummer

EDUCATION

1981 - 1986: University of Miami, Florida, USA
1986 ***Ph.D***. in Meteorology and Physical Oceanography

1975 - 1981: University of Munich, Germany
1981 ***Staatsexamen*** in Mathematics and Physics (equivalent to ***M.Sc***.*)*

EXPERIENCE

1995 to present Colorado State University, CIRA, Ft. Collins, Colorado
2006-present: Special Projects Manager/Deputy Program Manager with the CIRA/RAMM Team
1994-2005: GLOBE and FX-Net Project Manager and Supervisor

1988 – 1994 Member of the German Astronaut Team
German Aerospace Center (DLR), Cologne, Germany
1986 - 1988 Research Associate University of Colorado, CIRES, Boulder, CO

HONORS AND AWARDS

2001:CIRA Research Initiative Award
1994: Bundesverdienstkreuz der Bundesrepublik Deutschland
(Federal Service Cross of the Federal Republic of Germany)

PUBLICATIONS (refereed, 2012 – 2010)

- Grasso, L., D. Hillger, C. Schaaf , Z. Wang, **R. Brummer,** R. DeMaria, 2012: Use of MODIS 16 day albedo values in the generation of synthetic GOES-R natural color imagery. *Submitted to J. Appl. Remote Sens. (JARS) on 16 July 2012.*

- Steven J. Goodman; James Gurka; Mark DeMaria; Gary Jedlovec; Timothy Schmit; Chris Siewert; Anthony Mostek; Wayne Feltz; Jordan Gerth; **Renate Brummer**; Steven Miller; Bonnie Reed; Richard Reynolds, 2012: The GOES-R Proving Ground: Accelerating User Readiness for the Next Generation Geostationary Environmental Satellite. *Bull. Amer. Meteor. Soc.*, ***93,*** *Issue 7 (July 2012) pp. 1029-1040*
on-line release: http://journals.ametsoc.org/doi/pdf/10.1175/BAMS-D-11-00175.1

- Donald Hillger, Louie Grasso, Steve Miller, **Renate Brummer,** Robert DeMaria, 2011: Synthetic Advanced Baseline Imager True-Color Imagery. *J. Appl. Remote Sens. (JARS)* 5, 053520 (2011), DOI:10.1117/1.3576112

- Isidora Jankov, Lewis D. Grasso, Manajit Sengupta, Paul J. Neiman, Milija Zupanski, Daniel Lindsey,Donald W. Hillger, Daniel L. Birkenheuer, **Renate Brummer**, Huiling Yuan , 2011:

An Evaluation of Five ARW-WRF Microphysics Schemes Using Synthetic GOES Imagery for an Atmospheric River Event Affecting the California Coast. *Journal of Hydrometeorology*. Volume 12, Issue 4 (August 2011) pp. 618-633. doi: 10.1175/2010JHM1282.

- L.D. Grasso, M. Sengupta, P.J. Neiman, D. Zupanski, M. Zupanski, D.T. Lindsey, and **R.L. Brummer**, 2011: An Evaluation of Five WRF-ARW Microphysics Schemes Using Synthetic GOES Imagery for an Atmospheric River Event Affecting the California Coast. *Journal of Hydrometeorology*. Volume 12, Issue 4 (August 2011) pp. 618-633. doi: 10.1175/2010JHM1282.

- Zupanski, D., M. Zupanski, L.D. Grasso, **R.L. Brummer,** I. Jankov, D.T. Lindsey, M. Sengupta and M. DeMaria, 2011: Assimilating synthetic GOES-R radiances in cloudy conditions using an ensemble-based method. *International Journal of Remote Sensing, Vol 32, Issue 24, 9637-9659* http://dx.doi.org/10.1080/01431161.2011.572094

Abbreviated Curriculum Vitae for M. DeMaria

Education
Ph.D., Atmospheric Science, Colorado State University, 1983
M.S., Atmospheric Science, Colorado State University, 1979
B.S., Meteorology, Florida State University, 1977

Experience

1998-Present	Chief, Regional and Mesoscale Meteorology Branch, NESDIS/StAR
1995-1998	Chief, Technical Support Branch, National Hurricane Center
1987-1995	Research Meteorologist, Hurricane Research Division, NOAA/AOML
1985-1987	Assistant Professor, Dept. of Marine, Earth and Atmospheric Science, NCSU
1984-1985	Post Doctoral Fellow, Advanced Study Program, NCAR

Committees and Professional Societies
Member, American Geophysical Union, 2006-present
Member, American Meteorological Society, 1987-present
OFCM working group on tropical cyclone research, 2009-present
NOAA Hurricane Forecast Improvement Project Science Team Lead 2007-present
NOAA Hurricane Research Joint Action Group 2005-2007
NOAA GOES-R Risk Reduction Program Committee, Joint Chair, 2006-present.
NOAA Cooperative Institute oversight committee, 2005
NOAA internal Hurricane Intensity Research Working Group, 2005
Program manager, GOES Improved Measurement Product Assurance Plan, 2002-present
U.S. Weather Research Program Science Steering Committee, 1999-2003
Weather Research and Forecasting (WRF) Model Oversight Committee, 2000-2003
Associate Editor, Monthly Weather Review, 2002 and 2004-2006
Associate Editor, Weather and Forecasting, 2009-present.
Adjunct Faculty Member, Dept. of Atmospheric Science, CSU, 1999-present

Honors and Awards
2012: Colorado Governor's Award for high impact research
2012: AMS Banner I. Miller Award for best published paper on hurricane forecasting
2011: NOAA Bronze Medal for hurricane intensity model improvements
2010: NOAA Bronze Medal for new operational hurricane wind probability model
2009: OFCM Richard H. Hagemeyer Award for contributions to the U.S. Hurricane Program
2008: NOAA Bronze Medal for a new operational tropical cyclone formation probability product
2005: DOC Silver medal for improving tropical cyclone intensity forecasting using satellite data
2002: NOAA Bronze Medal for Hurricane Mitch Reconstruction Project
2002: AMS Banner I. Miller Award for best published paper on hurricane forecasting
1997: NOAA Bronze Medal for new inland wind model
1996: NWS Modernization Award for the development of N-AWIPS applications
1992: Dept. of Commerce Gold Medal (Group Award) for performance during Andrew
1989: AMS Banner I. Miller Award for best published paper on hurricane forecasting
1987: AMS Banner I. Miller Award for best published paper on hurricane forecasting
1981: AMS Max A. Eaton Prize for best student paper

Formal Publications (last 3 years)

Knaff., J.A., **M. DeMaria**, C.R. Sampson, J.E. Peak, J. Cummings, W.H. Schubert, 2012: Upper oceanic energy response to tropical cyclone passage. *J. Climate*, in press.

Li, X. J.A. Zhang, X. Yang, G. Pichel, **M. DeMaria**, D. Long, and Z. Li., 2012: Tropical cyclone morphology from spaceborne synthetic aperture radar. *Bull. Amer. Meteor. Soc*., in press.

Sampson, C.R., A.B. Schumacher, J.A. Knaff, **M. DeMaria**, E.M. Fukada, C.A. Sisko, D.P. Roberts, K.A. Winters, and H. M. Wilson, 2012: Objective guidance for use in setting tropical cyclone conditions of readiness. *Wea. Forecasting*, **27**, 1052-1060.

DeMaria, M., R.T. DeMaria, J.A. Knaff and D. Molenar, 2012: Tropical cyclone lighting and rapid intensity change. *Mon. Wea. Rev*., **140**, 1828-1842.

Goodman, S.J., J. Gurka, **M. DeMaria**, T. Schmit, A. Mostek, G. Jedlovec, C. Siewert, W. Feltz, J. Gerth, R. Brummer, S. Miller, B. Reed, R.R. Reynolds, 2012: The GOES-R Proving Ground: Accelerating user readiness for the next generation geostationary environmental satellite system. *Bull. Amer. Meteor. Soc.,* **93**, 1029-1040.

Hamill, T.M., M.J. Brennan, B. Brown, **M. DeMaria**, E.N. Rappaport and Z. Toth, 2012: NOAA's future ensemble-based hurricane forecast products. *Bull. Amer. Meteor. Soc.*,**93**, 209-220 .

Tsai, Hsiao-Chung, Kuo-Chen Lu, Nai-Ning Hsu, Aimei Chia, **Mark DeMaria**, 2011: An Application of the Monte Carlo Method: Tropical Cyclone Strike Probabilities. *Atmospheric Sciences*, **39**:3, 269-288.

Knaff, J. A., **M. DeMaria**, D. A. Molenar, C. R. Sampson, M. G. Seybold, 2011: An automated, objective, multiple-satellite-platform tropical cyclone surface wind analysis. *J. Appl. Meteor. Climatol*., **50**, 2149–2166. (Oct)

Sampson, C.R., J. Kaplan, J.A. Knaff, **M. DeMaria** and C.A. Sisko, 2011: A deterministic rapid intensification aid. *Wea. Forecasting*, **26**, 579-585.

Rappaport, E.N., J.L. Franklin, A.B Schumacher, **M. DeMaria**, L.K. Shay, and E.J. Gibney, 2010: Tropical cyclone intensity change before U.S. Gulf coast landfall. *W. Forecasting*, **5**, 1380-1396.

Grasso, L.D., M. Sengupta, and **M. DeMaria**, 2010: Comparison between observed and synthetic 6.5 and 10.7 μm GOES-12 imagery of thunderstorms that occurred on 8 May 2003. *Int. Journal of Remote Sensing*, **31**:3, 647-663.

Kaplan, J., **M. DeMaria**, and J.A. Knaff, 2010: A revised tropical cyclone rapid intensification index for the Atlantic and east Pacific basins. *Wea. Forecasting*, **25**, 220-241.

Abbreviated Curriculum Vitae for John A. Knaff

Tropical/Satellite Meteorologist
NOAA/NESDIS/StAR
CIRA/Colorado State University
Campus Delivery 1375
Fort Collins, CO 80523-1375

EDUCATION

Ph.D. Colorado State University, Atmospheric Science, 1997
Dissertation: ``Progress towards seasonal prediction in the tropics"
MS Colorado State University, Atmospheric Science, 1992
Thesis: ``Evidence of a stratospheric QBO modulation of tropical convection"
BS Texas A&M University, Meteorology, 1989

EXPERIENCE

Meteorologist, NOAA/NESDIS/StAR, Fort Collins, December 2006- present
Research Scientist II, CIRA, Colorado State University, July 2004 - November 2006
Research Scientist I, CIRA, Colorado State University, July 2002
Research Associate, CIRA, Colorado State University, May 1999 - July 2002
Post Doctoral Fellow, CIRA, Colorado State University, July 1997 - April 1999
Post Doctoral Research Associate, Colorado State University, April 1997 - July 1997.
Graduate Research Assistant, Colorado State University, July 1989- April 1997

AWARDS

- **CO-LABS 2012 Awards for High Impact Research** for creating advanced software that allows them to make direct comparisons between satellite observations and model forecasts to give a complete picture of tropical storms and their environments.
- **2012 NOAA Bronze Metal** for providing skillful operational hurricane intensity models as demonstrated by the NHC forecast verifications for the 2009 and 2010 seasons.
- **2010 NOAA Bronze Metal** for developing, implementing and conducting outreach for the new National Hurricane Center Tropical Cyclone Surface Wind Speed Probability products – along with M. DeMaria, A. Krautkramer, C. Lauer, C. Sisko, R. Knabb, C. Junkins, T. Schott, M. Mainelli, and E. Rappaport.
- **2007 NOAA Bronze Award** for the development and operational implementation of the Tropical Cyclone Formation product that quantitatively predicts storm formation probability along with Mark DeMaria, Antonio Irving, Nancy Merckle.
- **2004 NOAA David Johnson Award** for basic research for improving the understanding of tropical phenomenon and predicting tropical cyclone intensity, accompanied by exemplary transfer of the results into operational products.
- **Cooperative Institute for Research in the Atmosphere, Research Initiative Award** for innovative research and algorithm development using GOES rapid scan imagery, GOES sounder data and AMSU sensor data, 2000-2001.

- **Cooperative Institute for Research in the Atmosphere Post Doctoral Fellowship**, September 1997.
- Invited to the **1993 NOAA Colloquium on Environmental Prediction**, Silver Springs, MD.
- **NASA Graduate Student Fellowship in Global Change Research** (September 1992 to August 1995).

SELECT PUBLICATIONS TC STRUCTURE AND OPERATIONAL TRANSITIONS

Sampson, Charles R., A. B. Schumacher**, J. A. Knaff**, M. DeMaria, E. M. Fukada, C. A. Sisko, D. P. Roberts, K. A. Winters, H. M. Wilson , 2012: Objective guidance for use in setting tropical cyclone conditions of readiness. *Wea. Forecasting*, **27**, 1052–1060.

DeMaria, M., R.T. DeMaria, **J.A. Knaff** and D.A. Molenar, 2012: Tropical cyclone lighting and rapid intensity change. *Mon. Wea. Rev*., **140**, 1828-1842.

Vigh, J.L., **J.A. Knaff**, W.H. Schubert, 2012: A climatology of hurricane eye formation. *Mon. Wea. Rev*., **140:**5, 1405–1426.

Knaff, J. A., M. DeMaria, D. A. Molenar, C. R. Sampson and M. G. Seybold, 2011: An automated, objective, multi-satellite platform tropical cyclone surface wind analysis. *J. Appl. Meteorol. Climatol.* **50**:10, 2149-2166. doi: 10.1175/2011JAMC2673.1

Knaff, J. A., P. J. Fitzpatrick, C. R. Sampson, Y. Jin, and C.M. Hill, 2011: Simple Diagnosis of Tropical Cyclone Structure via Pressure Gradients. *Wea. Forecasting.* **26**:6, 1020-1031.

Sampson, C. R., Kaplan, **J. A. Knaff**, M. DeMaria, and C. Sisko, 2011: A deterministic rapid intensification aid. *Wea. Forecasting*, **26** (4), 579-585

Knaff, J. A., D. P. Brown, J. Courtney, G. M. Gallina, J. L. Beven II, 2010: An evaluation of Dvorak Technique-based tropical cyclone intensity estimates. *Wea. Forecasting*, **25**:5, 1362-1379.

Kaplan, J., M. DeMaria, and **J.A. Knaff**, 2010: A revised tropical cyclone rapid intensification index for the Atlantic and east Pacific basins. *Wea. Forecasting*, **25**, 220-241.

Courtney, J., and **J. A. Knaff**, 2009: Adapting the Knaff and Zehr wind-pressure relationship for operational use in Tropical Cyclone Warning Centres. *Australian Meteorological and Oceanographic Journal*, **58**, 3, 167-179.

Knaff, J. A., and C. R. Sampson, 2009a: Southern Hemisphere tropical cyclone intensity forecast methods used at the Joint Typhoon Warning Center, Part I: Control forecasts based on climatology and persistence. *Australian Meteorological and Oceanographic Journal*, **58**, 1, 1-7

Knaff, J. A., and C. R. Sampson, 2009b: Southern Hemisphere tropical cyclone intensity forecast methods used at the Joint Typhoon Warning Center, Part II: Statistical – dynamical forecasts. *Australian Meteorological and Oceanographic Journal*, **58**, 1, 9-18

Sampson, C. R. and **J. A. Knaff**, 2009: Southern Hemisphere tropical cyclone intensity forecast methods used at the Joint Typhoon Warning Center, Part III: Statistical – consensus forecasts. *Australian Meteorological and Oceanographic Journal*, **58**, 1, 19-27

Schumacher, A. B., M. DeMaria, and **J. A. Knaff**, 2009: Objective Estimation of the 24-hour probability of tropical cyclone formation. *Wea. Forecasting*, **24**, 456-471.

Knaff, J.A., 2009: Revisiting the maximum intensity of recurving tropical cyclones. *Int. J. Climatology*., **29**, 827-837.

FEDERAL SUPPORT:

John Knaff is supported by NOAA/NESDIS base funds.

G. Current and Pending Federal Support

Co-PI name: Christopher Rozoff

Current

Project Title: Collaborative Research: The Relationships Between Sheared Convective Clouds and Tropical Cyclone Evolution
Sponsor: NSF (PI)
Award ID: NSF Award AGS-1140234
Award Amount: $163,486
Dates: 1 Jan 2012 – 31 Dec. 2014
Duration: 3 years

Project Title: Improved Understanding and Diagnosis of Tropical Cyclone Structure and Structure Changes
Sponsor: NOAA GOES-R Program Office (CoI)
Award ID: NOAA Grant NA10NES4400013
Award Amount: $98,300
Dates: 1 May 2011 – 30 Apr. 2013
Duration: 2 years

Project Title: Improvements to the SHIPS Rapid Intensification Index
Sponsor: NOAA JHT (CoI)
Award ID: NOAA Award NA11OAR4310200
Award Amount: $65,949
Dates: 1 August 2011 – 31 July 2013
Duration: 2 years

Pending

Project Title: The Relationships Between Hemispheric Vortices, Large-Scale Waves, and Superrotation in the Venus Atmosphere
Sponsor: NSF (PI)
Award Amount: $591,529
Dates: 1 May 2013 – 30 April 2016
Duration: 3 years

PI: Jonathan Vigh **Date: November 2012**

CURRENT & PENDING FEDERAL SUPPORT

"In the event that an unanticipated overlap does occur, the level of effort would be adjusted and/or additional personnel would be added, in concurrence with funding sources."

Project Title: FY12 DTC Visitor Program – Development of an HWRF Diagnostics Module to Evaluate Intensity and Structure Using Synthetic Flight Paths Through Tropical Cyclones
Principal Investigator: Louisa Nance
Source of Support: NSF – Cooperative Agreement #M0856145
Award Amount: $100,000
Period Covered: 10/1/2008-9/30/2013
Person Months Committed to the Project: 1.92 funded by sponsor _____ cosponsored
☒Current ☐Pending

Project Title: FY13 DTC Visitor Program – Further Development of a Diagnostics and Verification Module to Evaluate the Basin-scale HWRF Model
Principal Investigator: Louisa Nance
Source of Support: NSF – Cooperative Agreement #M0856145
Award Amount: $100,000
Period Covered: 10/1/2008-9/30/2013
Person Months Committed to the Project: 1.92 funded by sponsor _____ cosponsored
☐Current ☒Pending

Project Title: Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution
Principal Investigator: Jonathan Vigh
Source of Support: NOAA
Award Amount: $103,724
Period Covered: 8/1/2013-8/1/2015
Person Months Committed to the Project: 3.48 funded by sponsor _____ cosponsored
☐Current ☒Pending – This Submission

PI: Barbara Brown **Date: November 2012**

CURRENT & PENDING SUPPORT

"In the event that an unanticipated overlap does occur, the level of effort would be adjusted and/or additional personnel would be added, in concurrence with funding sources."

Project Title: A Cooperative Agreement to Establish a Numerical Developmental Testbed Center
Principal Investigator: Barbara Brown
Source of Support: NOAA – Contract S4670046
Award Amount: $14,094,880
Period Covered: 9/1/2008-8/31/2013
Person Months Committed to the Project: 2.28 funded by sponsor _____ cosponsored
☒Current ☐Pending

Project Title: Application of A-Train Satellite Observations to Enhance NWP Products for Next Generation Air Transportation System (NextGen)
Principal Investigator: Barbara Brown
Source of Support: NASA – Contract #X09AN79G
Award Amount: $1,172,768
Period Covered: 6/29/2009-6/28/2013
Person Months Committed to the Project: 1.2 funded by sponsor _____ cosponsored
☒Current ☐Pending

Project Title: FY12 Developmental Testbed Center (DTC) Project for the Air Force Weather Agency (AFWA)
Principal Investigator: Barbara Brown
Source of Support: DOD – United States Air Force – NSF Grant #M0939961
Award Amount: $879,706
Period Covered: 2/1/2012-9/30/2013
Person months Committed to the Project: .6 funded by sponsor _____ cosponsored
☒Current ☐Pending

Project Title: Proposal to Support Incorporation of Data Assimilation and Continued Development of PME's WRF Model
Principal Investigator: Paul Kucera
Source of Support: NOAA - National Weather Service – Contract #
Award Amount: $547,890
Period Covered: 4/4/2012-6/6/2013
Person Months Committed to the Project: .24 funded by sponsor _____ cosponsored
☒Current ☐Pending

9/01/94, c&ps1.frm

Project Title: Establishment of a Center for International Partnerships in Numerical Weather Prediction Research, Application Development and Training
Principal Investigator: Paul Kucera
Source of Support: NOAA – National Weather Service
Award Amount: $3.5M
Period Covered: 1/14/2012-12/31/2016
Person Months Committed to the Project: 1.2 funded by sponsor _____ cosponsored
☐Current ☒Pending

Project Title: Collaborative Research: Ea SM 2: Advanced Climate and Regional Model Validation for Societal Applications
Principal Investigator: Lawrence Buja
Source of Support: NSF
Award Amount: $2,282,530
Period Covered: 1/1/2013-12/31/2017
Person Months Committed to the Project: 0 funded by sponsor .24 cosponsored
☐Current ☒Pending

Project Title: A Public-Private Academic Partnership to Advance Solar Power Forecasting
Principal Investigator: Sue Ellen Haupt
Source of Support: Department of Energy
Award Amount: $4,500,000
Period Covered: 10/1/2012-8/1/2014
Person Months Committed to the Project: 1.8 funded by sponsor __ cosponsored
☐Current ☒Pending

Project Title: Error Characterization and Adaptive Bias Removel Algorithms for Improved Quantitative Precipitation Estimation Using the GPM Mission Data
Principal Investigator: Eric Gilleland
Source of Support: NASA
Award Amount: $386,734
Period Covered: 1/1/2013-12/31/2015
Person Months Committed to the Project: .12 funded by sponsor _____ cosponsored
☐Current ☒Pending

Project Title: FY13 Developmental Testbed Center (DTC) Project for the Air Froce Weather Agency
Principal Investigator: Barbara Brown
Source of Support: DOD – United States Air Force
Award Amount: $1,363,178

Period Covered: 2/1/2013-1/31/2014
Person Months Committed to the Project: .36 funded by sponsor _____ cosponsored
☐Current ☒Pending

Project Title: Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution
Principal Investigator: Jonathan Vigh
Source of Support: NOAA
Award Amount: $103,724
Period Covered: 8/1/2013-8/1/2015
Person Months Committed to the Project: __ funded by sponsor .36 cosponsored
☐Current ☒Pending – This Submission

CURRENT AND PENDING FEDERAL SUPPORT

PI Renate Brummer:

1. Project Title: Research and Development for GOES-R Risk Reduction for Mesoscale Weather Analysis and Forecasting and Analysis of Simulated Radiance Fields for GOES-R ABI Bands for Mesoscale Weather and Hazard Events
   Status: Funded
   Supporting Agency: NOAA/NESDIS/StAR
   Award Number: NA09OAR4320074
   Investigator Months: July1, 2012 – June 30, 2013 Commitment: 2.0 mo/yr
   CIRA Grant for the current year: $ 415,343
   Duration: 3 years

2. Project Title: CIRA Support to GOES Improvement and Product Application Program
   Status: Funded
   Supporting Agency: NOAA/NESDIS/StAR
   Award Number: NA09OAR4320074
   Investigator Months: July1, 2012 – June 30, 2013 Commitment: 1.0 mo/yr
   CIRA Grant for the current year: $ 278,100
   Duration: 2 years

3. Project Title: A GOES-R Proving Ground for National Weather Service Forecaster Readiness
   Status: Funded
   Supporting Agency: NOAA/NESDIS/StAR
   Award Number: NA09OAR4320074
   Investigator Months: July1, 2012 – June 30, 2013 Commitment: 2.5 mo/yr
   CIRA Grant for the current year: $ 290,000
   Duration: 1 year

4. Project Title: CIRA Support to JPSS Science Program: NPP VIIRS EDR Imagery Algorithm and Validation Activities and NPP VIIRS Cloud Validation Development of a Probabilistic Tropical Cyclone Prediction Scheme
   Status: Funded
   Supporting Agency: NOAA/NESDIS/StAR
   Award Number: NA09OAR4320074
   Investigator Months: July1, 2012 – June 30, 2013 Commitment: 1.0 mo/yr
   CIRA Grant for the current year: $ 335,000
   Duration: 1 year

5. Project Title: CIRA Support to the JPSS Proving Ground and Risk Reduction Program
   Status: Funded
   Supporting Agency: NOAA/NESDIS/StAR
   Award Number: NA09OAR4320074
   Investigator Months: July1, 2012 – June 30, 2013 Commitment: 0.5 mo/yr
   CIRA Grant for the current year: $ 208,875

Duration: 1 year

6. Project Title: CIRA Support for Transition of Tropical Cyclone Forecast Products
   Status: Funded
   Supporting Agency: NOAA/NESDIS/StAR PSDI Program
   Award Number: NA09OAR4320074
   Investigator Months: July1, 2012 – June 30, 2013 Commitment: 0.5 mo/yr
   CIRA Grant for the current year: $ 130,000
   Duration: 1 year

7. Project Title: Improvement in Statistical Tropical Cyclone Models
   Status: Funded
   Supporting Agency: NOAA/Joint Hurricane Testbed
   Award Number: NA11OAR4310203
   Investigator Months: 8/1/2011 – 6/30/2013; Commitment: 0.5 mo/yr
   CIRA Grant for the current year: $ 43,000
   Duration: 2 years

8. Project Title: Empirical-Dynamical Modeling of Tropical Cyclone Structure Evolution
   Status: this proposal
   Supporting Agency: NOAA/Joint Hurricane Testbed
   Investigator Months: 8/1/2013 – 7/31/2014; Commitment: 0.25 mo/yr
   CIRA Grant requested: $ 12,000
   Duration: 2 years

Collaborator Mark DeMaria:

Mark DeMaria is base funded by NESDIS/STAR and his participation in the project will be at no cost to the JHT.

Collaborator John Knaff:

John Knaff is base funded by NESDIS/STAR and his participation in the project will be at no cost to the JHT.

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: 1396006492A1

ORGANIZATION:
University of Wisconsin - Madison and Extension
21 North Park Street Suite 6401
Madison, WI 53715

DATE:06/15/2012

FILING REF.: The preceding agreement was dated 04/06/2011

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

	EFFECTIVE PERIOD				
TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
PRED.	07/01/2010	06/30/2011	49.50	On Campus	Organized Research
PRED.	07/01/2011	06/30/2013	50.50	On Campus	Organized Research
PRED.	07/01/2010	06/30/2013	50.00	On Campus	Instruction
PRED.	07/01/2010	06/30/2013	36.00	On Campus	Public Service
PRED.	07/01/2010	06/30/2013	32.00	On Campus	Ext. Public Service
PRED.	07/01/2010	06/30/2013	34.50	On Campus	Primate Ctr Rate (A)
PRED.	07/01/2010	06/30/2013	14.00	On Campus	Primate Ctr Rate (B)
PRED.	07/01/2010	06/30/2013	26.00	Off Campus	AllPrograms

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
PROV.	07/01/2013	Until Amended			"Use same rates and conditions as cited for fiscal year ended 06/30/13"

*BASE

Modified total direct costs, consissting of all salaries and wages, fringe benefits, materials, supplies, services, travel and subgrants and subcontracts up to the first $25,000 or each subgrant or subcontract(regardless of the period covered by the subgrant or subcontract). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, tuition remission, rental costs of off-site facilites, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of $25,000.

(A) All Primate Center.

(B) Non P.51 Core grants only.

ORGANIZATION: University of Wisconsin - Madison and Extension
AGREEMENT DATE: 06/15/2012

SECTION I: FRINGE BENEFIT RATES**

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
FIXED	7/1/2011	6/30/2012	44.00	All	(1)
FIXED	7/1/2011	6/30/2012	58.00	All	(2)
FIXED	7/1/2011	6/30/2012	25.40	All	(3)
FIXED	7/1/2011	6/30/2012	27.30	All	(4)
FIXED	7/1/2011	6/30/2012	17.80	All	(5)
FIXED	7/1/2011	6/30/2012	18.00	All	(6)
FIXED	7/1/2011	6/30/2012	6.00	All	(7)
FIXED	7/1/2011	6/30/2012	3.50	All	(8)
FIXED	7/1/2012	6/30/2013	41.00	All	(1)
FIXED	7/1/2012	6/30/2013	56.00	All	(2)
FIXED	7/1/2012	6/30/2013	26.70	All	(3)
FIXED	7/1/2012	6/30/2013	28.00	All	(4)
FIXED	7/1/2012	6/30/2013	17.80	All	(5)
FIXED	7/1/2012	6/30/2013	20.00	All	(6)
FIXED	7/1/2012	6/30/2013	9.10	All	(7)
FIXED	7/1/2012	6/30/2013	2.30	All	(8)

PROV.	7/1/2013	Until amended	"Use same rates and conditions as cited for FYE 6/30/13."

** DESCRIPTION OF FRINGE BENEFITS RATE BASE:

Salaries and wages of faculty and staff including vacation, hoiday abd sick leave pay and other paid absences of only the faculty and staff. Rate does not apply to student employees, research or teaching assistants.

(1) Regular Faculty and Academic Staff
(2) Regular Classified
(3) Research Associates and Grad Interns
(4) Research Assistants, Project Assistants, Teaching Assistants, Pre-Doc Fellows and/or Trainees
(5) Post-Doc Fellows and/or Trainees
(6) Limited Term Employees (LTE's)
(7) Ad Hoc Program Specialists, Undergraduate Assistants and Undergraduate Interns
(8) Student Hourly Employees

Fringe Benefit rates are combined rates for Madison and Milwaukee Campuses and are applied to both the campuses. These Fringe Benefit rates are also included on the University of Wisconsin, Milwaukee rate agreement.

ORGANIZATION: University of Wisconsin - Madison and Extension

AGREEMENT DATE: 06/15/2012

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

The fringe benefits are charged using the rate(s) listed in the Fringe Benefits Section of this Agreement. The fringe benefits included in the rate(s) are listed below.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-CAMPUS DEFINITION: For all activities performed in facilities not owned by the institution and to which rent is directly allocated to the project(s) the off-campus rate will apply. Grants or contracts will not be subject to more than one F&A cost rate. If more than 50% of a project is performed off-campus, the off-campus rate will apply to the entire project.

Equipment Definition -
Equipment means an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit.

FRINGE BENEFITS:

FICA
Retirement
Disability Insurance
Worker's Compensation
Life Insurance
Unemployment Insurance
Health Insurance
Severance Allowance
ERA Administration
Income Continuation Insurance

ORGANIZATION: University of Wisconsin - Madison and Extension

AGREEMENT DATE: 06/15/2012

SECTION III: GENERAL

A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted: such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Office of Management and Budget Circular A-21 Circular, and should be applied to grants, contracts and other agreements covered by this Circular, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

University of Wisconsin - Madison and Extension

(INSTITUTION)

(SIGNATURE)

(NAME)

Assoc. Vice Chancellor

(TITLE)

6-26-12

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

(SIGNATURE)

Arif Karim

(NAME)

Director, Central States Field Office

(TITLE)

6/15/2012

(DATE) 5121

HHS REPRESENTATIVE: Shon Turner

Telephone: (214) 767-3261

OMB Number: 4040-0004
Expiration Date: 03/31/2012

Application for Federal Assistance SF-424

* 1. Type of Submission:	* 2. Type of Application:	* If Revision, select appropriate letter(s):
☐ Preapplication	☒ New	
☒ Application	☐ Continuation	* Other (Specify):
☐ Changed/Corrected Application	☐ Revision	

* 3. Date Received:	4. Applicant Identifier:
12/05/2012	

5a. Federal Entity Identifier:	5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name:	The Board of Regents of the University of Wisconsin System

* b. Employer/Taxpayer Identification Number (EIN/TIN):	* c. Organizational DUNS:
396006492	1612021220000

d. Address:

* Street1:	21 N Park St Ste 6401
Street2:	
* City:	Madison
County/Parish:	
* State:	WI: Wisconsin
Province:	
* Country:	USA: UNITED STATES
* Zip / Postal Code:	53715-1218

e. Organizational Unit:

Department Name:	Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:		* First Name:	Brenda
Middle Name:			
* Last Name:	Egan		
Suffix:			

Title:	Sr. Grants & Contracts Specialist

Organizational Affiliation:
The Board of Regents of the University of Wisconsin System

* Telephone Number:	608-262-9029	Fax Number:	

* Email:	baegan@rsp.wisc.edu

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

H: Public/State Controlled Institution of Higher Education

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Department of Commerce

11. Catalog of Federal Domestic Assistance Number:

11.459

CFDA Title:

Weather and Air Quality Research

*** 12. Funding Opportunity Number:**

NOAA-OAR-OWAQ-2013-2003469

* Title:

FY 2013 Joint Hurricane Testbed

13. Competition Identification Number:

2297052

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: US-All

b. Program/Project: US-All

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 08/01/2013

* b. End Date: 07/31/2015

18. Estimated Funding ($):

* a. Federal	85,968.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	85,968.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix:

* First Name: Nick

Middle Name:

* Last Name: Novak

Suffix:

* Title: Managing Officer

* Telephone Number: 608-262-3822

Fax Number:

* Email: preaward@rsp.wisc.edu

* Signature of Authorized Representative: Brenda Egan

* Date Signed: 12/05/2012

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 06/30/2014

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Weather and Air Quality Research - Year 1	11.459	$	$	$ 41,649.00	$	$ 41,649.00
2. Weather and Air Quality Research - Year 2	11.459			44,319.00		44,319.00
3.						
4.						
5. Totals		$	$	$ 85,968.00	$	$ 85,968.00

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Prescribed by OMB (Circular A -102) Page 1

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1) Weather and Air Quality Research - Year 1	(2) Weather and Air Quality Research - Year 2	(3)	(4)	Total (5)
a. Personnel	$ 19,627.00	$ 20,020.00	$	$	$ 39,647.00
b. Fringe Benefits	8,047.00	8,208.00			16,255.00
c. Travel	0.00	1,220.00			1,220.00
d. Equipment	0.00	0.00			
e. Supplies	0.00	0.00			
f. Contractual	0.00	0.00			
g. Construction	0.00	0.00			
h. Other	0.00	0.00			
i. Total Direct Charges (sum of 6a-6h)	27,674.00	29,448.00			$ 57,122.00
j. Indirect Charges	13,975.00	14,871.00			$ 28,846.00
k. TOTALS (sum of 6i and 6j)	$ 41,649.00	$ 44,319.00	$	$	$ 85,968.00
7. Program Income	$	$	$	$	$

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SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8.	$	$	$	$
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$	$	$	$

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$	$	$	$	$
14. Non-Federal	$				
15. TOTAL (sum of lines 13 and 14)	$	$	$	$	$

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. 11.459 - Weather and Air Quality Research - 1st Quarter	$ 11,079.75	$	$	$
17. 11.459 - Weather and Air Quality Research - 2nd Quarter	11,079.75			
18. 11.459 - Weather and Air Quality Research - 3rd Quarter	11,079.75			
19. 11.459 - Weather and Air Quality Research - 4th Quarter	11,079.75			
20. TOTAL (sum of lines 16 - 19)	$ 44,319.00	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: 57,122

22. Indirect Charges: 28,846

23. Remarks:

OMB Number: 4040-0007
Expiration Date: 06/30/2014

ASSURANCES - NON-CONSTRUCTION PROGRAMS

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C.§§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U. S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

* SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	* TITLE
Brenda Egan	Managing Officer
* APPLICANT ORGANIZATION	* DATE SUBMITTED
The Board of Regents of the University of Wisconsin System	12/05/2012

Standard Form 424B (Rev. 7-97) Back

FORM **CD-511**
(REV 1-05)

U.S. DEPARTMENT OF COMMERCE

CERTIFICATION REGARDING LOBBYING

Applicants should also review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 28, 'New Restrictions on Lobbying.' The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of Commerce determines to award the covered transaction, grant, or cooperative agreement.

LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000 or a loan or loan guarantee over $150,000 as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying.' in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

In any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying,' in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification.

* NAME OF APPLICANT

The Board of Regents of the University of Wisconsin System

* AWARD NUMBER

Not Assigned

* PROJECT NAME

Empirical-dynamical Modeling of Tropical Cyclone Structure

Prefix:

* First Name: Nick

Middle Name:

* Last Name: Novak

Suffix:

* Title: Managing Officer

* SIGNATURE: Brenda Egan

* DATE: 12/05/2012

OMB Number: 4040-0004
Expiration Date: 03/31/2012

Application for Federal Assistance SF-424

* 1. Type of Submission:	* 2. Type of Application:	* If Revision, select appropriate letter(s):
☐ Preapplication	☒ New	
☒ Application	☐ Continuation	* Other (Specify):
☐ Changed/Corrected Application	☐ Revision	

* 3. Date Received:	4. Applicant Identifier:
12/06/2012	2013-1077

5a. Federal Entity Identifier:	5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: University Corporation for Atmospheric Research

* b. Employer/Taxpayer Identification Number (EIN/TIN):	* c. Organizational DUNS:
84-0412668	0783395870000

d. Address:

* Street1:	1850 Table Mesa Drive
Street2:	
* City:	Boulder
County/Parish:	
* State:	CO: Colorado
Province:	
* Country:	USA: UNITED STATES
* Zip / Postal Code:	80305-5602

e. Organizational Unit:

Department Name:	Division Name:
NCAR	RAL

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:	Ms.	* First Name:	Susan
Middle Name:			
* Last Name:	Broussard		
Suffix:			

Title: Division Administrator II

Organizational Affiliation:
National Center for Atmospheric Research

* Telephone Number:	303-497-2767	Fax Number:	303-497-8401

* Email: susanb@ucar.edu

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

M: Nonprofit with 501C3 IRS Status (Other than Institution of Higher Education)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Department of Commerce

11. Catalog of Federal Domestic Assistance Number:

11.459

CFDA Title:

Weather and Air Quality Research

*** 12. Funding Opportunity Number:**

NOAA-OAR-OWAQ-2013-2003469

* Title:

FY 2013 Joint Hurricane Testbed

13. Competition Identification Number:

2297052

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: CO-002 | b. Program/Project: US-All

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 08/01/2013 | * b. End Date: 07/31/2015

18. Estimated Funding ($):

* a. Federal	104,353.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	104,353.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: Ms. | * First Name: Virginia

Middle Name: L.

* Last Name: Taberski

Suffix:

* Title: Contracts Director

* Telephone Number: 303-497-2132 | Fax Number: 303-497-8501

* Email: fedaward@ucar.edu

* Signature of Authorized Representative: Lori LaFon | * Date Signed: 12/06/2012

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 06/30/2014

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Weather and Air Quality Research - Year 1	11.459	$	$	$ 52,498.00	$	$ 52,498.00
2. Weather and Air Quality Research - Year 2	11.459			51,855.00		51,855.00
3.						
4.						
5. Totals		$	$	$ 104,353.00	$	$ 104,353.00

Standard Form 424A (Rev. 7- 97)
Prescribed by OMB (Circular A -102) Page 1

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1) Weather and Air Quality Research - Year 1	(2) Weather and Air Quality Research - Year 2	(3)	(4)	Total (5)
a. Personnel	$ 19,416.00	$ 20,193.00	$	$	$ 39,609.00
b. Fringe Benefits	10,329.00	10,743.00			21,072.00
c. Travel	1,608.00	0.00			1,608.00
d. Equipment	0.00	0.00			
e. Supplies	250.00	250.00			500.00
f. Contractual	0.00	0.00			
g. Construction	0.00	0.00			
h. Other	3,735.00	3,735.00			7,470.00
i. Total Direct Charges (sum of 6a-6h)	35,338.00	34,921.00			$ 70,259.00
j. Indirect Charges	17,160.00	16,934.00			$ 34,094.00
k. TOTALS (sum of 6i and 6j)	$ 52,498.00	$ 51,855.00	$	$	$ 104,353.00
7. Program Income	$	$	$	$	$

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Standard Form 424A (Rev. 7- 97)
Prescribed by OMB (Circular A -102) Page 1A

SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8.	$	$	$	$
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$	$	$	$

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 52,498.00	$ 13,125.00	$ 13,125.00	$ 13,124.00	$ 13,124.00
14. Non-Federal	$				
15. TOTAL (sum of lines 13 and 14)	$ 52,498.00	$ 13,125.00	$ 13,125.00	$ 13,124.00	$ 13,124.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. 11.459 - Weather and Air Quality Research - 1st Quarter	$ 12,964.00	$	$	$
17. 11.459 - Weather and Air Quality Research - 2nd Quarter	12,964.00			
18. 11.459 - Weather and Air Quality Research - 3rd Quarter	12,964.00			
19. 11.459 - Weather and Air Quality Research - 4th Quarter	12,963.00			
20. TOTAL (sum of lines 16 - 19)	$ 51,855.00	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: Modified Total Direct Costs (MTDC) $62,789

22. Indirect Charges: $34,094 Indirect Costs on MTDC

23. Remarks: Indirect Costs = FY13 rate of 54.3% x MTDC = .543 x $62,789 = $34,094

OMB Number: 4040-0007
Expiration Date: 06/30/2014

ASSURANCES - NON-CONSTRUCTION PROGRAMS

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C.§§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U. S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

* SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	* TITLE
Lori LaFon	Contracts Director
* APPLICANT ORGANIZATION	* DATE SUBMITTED
University Corporation for Atmospheric Research	12/06/2012

Standard Form 424B (Rev. 7-97) Back

FORM **CD-511**
(REV 1-05)

U.S. DEPARTMENT OF COMMERCE

CERTIFICATION REGARDING LOBBYING

Applicants should also review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 28, 'New Restrictions on Lobbying.' The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of Commerce determines to award the covered transaction, grant, or cooperative agreement.

LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000 or a loan or loan guarantee over $150,000 as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying.' in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

In any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying,' in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification.

* NAME OF APPLICANT

University Corporation for Atmospheric Research

* AWARD NUMBER

Not assigned

* PROJECT NAME

Empirical-dynamical Modeling of Tropical Cyclone Structure..

Prefix: Ms.

* First Name: Virginia

Middle Name: L.

* Last Name: Taberski

Suffix:

* Title: Contracts Director

* SIGNATURE: Lori LaFon

* DATE: 12/06/2012

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Program Support Center
Financial Management Service
Division of Cost Allocation

DCA Western Field Office
90 7th Street, Suite 4-600
San Francisco, CA 94103
PHONE: (415) 437-7820
FAX: (415) 437-7823
E-MAIL: dcasf@psc.hhs.gov

JUL 26 2012

David Ryan, Controller
Colorado State University
Business and Financial Services
6003 Campus Delivery
Fort Collins, CO 80523-6003

Dear Mr. Ryan:

A copy of an indirect cost/fringe benefit Negotiation Agreement is attached. This Agreement reflects an understanding reached between your organization and a member of my staff concerning the rate(s) that may be used to support your claim for indirect/fringe benefit costs on grants and contracts with the Federal Government. Please have the Agreement signed by a duly authorized representative of your organization and return it to me BY FAX, retaining the copy for your files. We will reproduce and distribute the Agreement to the appropriate awarding organizations of the Federal Government for their use.

An indirect cost and fringe benefit proposal together with supporting information are required to substantiate your claim for costs under grants and contracts awarded by the Federal Government. Thus, your next indirect cost based on your fiscal year ended June 30, 2013 is due in our office by December 31, 2013, and your next fringe benefit proposal based on your fiscal year ending June 30, 2012, is due in our office by December 31, 2012.

Sincerely,

Arif Karim, Director
Division of Cost Allocation

Attachment

PLEASE SIGN AND RETURN THE NEGOTIATION AGREEMENT BY FAX

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN:

DATE:07/20/2012

ORGANIZATION:

Colorado State University Business and Financial Services
202 Johnson Hall
Fort Collins, CO 80523

FILING REF.: The preceding agreement was dated 06/21/2011

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

	EFFECTIVE PERIOD				
TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
PRED.	07/01/2009	06/30/2010	47.00	On-Campus	Org. Res. (1)
PRED.	07/01/2010	06/30/2011	47.50	On-Campus	Org. Res. (1)
PRED.	07/01/2011	06/30/2012	48.00	On-Campus	Org. Res. (1)
PRED.	07/01/2012	06/30/2013	48.50	On-Campus	Org. Res. (1)
PRED.	07/01/2013	06/30/2014	48.70	On-Campus	Org. Res. (1)
PRED.	07/01/2009	06/30/2014	26.00	Off-Campus	Org. Res. (1)
PRED.	07/01/2009	06/30/2014	55.70	On-Campus	Instruction (1)
PRED.	07/01/2009	06/30/2014	26.00	Off-Campus	Instruction (1)
PRED.	07/01/2009	06/30/2014	31.30	On-Campus	(A) (1)
PRED.	07/01/2009	06/30/2014	26.00	Off-Campus	(A) (1)
PRED.	07/01/2009	06/30/2014	26.00	Off-Campus	(B) (2)
PRED.	07/01/2009	06/30/2014	8.00	Off-Campus	(C) (1)

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
PROV.	07/01/2014	Until Amended		(D)	

*BASE

(1) Modified total direct costs, consisting of all salaries and wages, fringe benefits, materials, supplies, services, travel and subgrants and subcontracts up to the first $25,000 of each subgrant or subcontract (regardless of the period covered by the subgrant or subcontract). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of $25,000.

(2) Same as (1) above except the cost of reimbursements to cooperators performing fire suppression activities funded from the Emergency Fire Fund or Governor's Office Executive Orders, and the cost of direct financial assistance to cooperators for fire prevention and forest management activities are excluded from the State Forest Service rate base.

(A) Other Sponsored Activities

(B) State Forest Service

(C) Intergovernmnetal Personnel Act Agreements

(D) Use same rates and conditions as those cited for fiscal year ending June 30, 2014.

ORGANIZATION: Colorado State University Business and Financial Services

AGREEMENT DATE: 07/20/2012

SECTION I: FRINGE BENEFIT RATES**

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
FIXED	7/1/2012	6/30/2013	24.10	All (A)	Fac. & Prof. (1)
FIXED	7/1/2012	6/30/2013	33.10	All (A)	State Classified
FIXED	7/1/2012	6/30/2013	1.00	All (A)	Student Hourly
FIXED	7/1/2012	6/30/2013	17.70	All (A)	Temporary (2)
FIXED	7/1/2012	6/30/2013	5.10	All (A)	All Graduate Students
FIXED	7/1/2012	6/30/2013	9.20	All (A)	First Year Post Docs (3)
FIXED	7/1/2012	6/30/2013	2.20	All (A)	Temporary (4)
FIXED	7/1/2012	6/30/2013	16.40 (5)	(B)	All Employees of (5)

** DESCRIPTION OF FRINGE BENEFITS RATE BASE:

(A) Salaries and wages including vacation, holiday, sick leave pay and other paid absences.

(B) Salaries and wages excluding vacation, holiday, sick leave pay and other paid absences.

(1) Faculty, administrative professionals and second-year plus post docs and interns

(2) Temporary non-student hourly

(3) First-year post docs and interns

(4) Temporary first-year faculty, administrative professionals, including continuing temporary faculty and administrative professionals at less than 50% time.

(5) Leave benefit rate for Center for Environmental Management of Military Lands (CEMML) & Colorado National Heritage Program (CNHP)

ORGANIZATION: Colorado State University Business and Financial Services

AGREEMENT DATE: 07/20/2012

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

The fringe benefits are charged using the rate(s) listed in the Fringe Benefits Section of this Agreement. The fringe benefits included in the rate (s) are:

WORKERS COMPENSATION, MEDICAL/LIFE INSURANCE, DISABILITY INSURANCE, UNEMPLOYMENT INSURANCE, MEDICARE, RETIREMENT PERA/DCP, RETIREMENT TERMINATION PAY, EXCESS LEAVE, RETIREE HEALTH INSURANCE, AND EMPLOYEES' TUITION (DOES NOT INCLUDE GRADUATE STUDENTS).

TREATMENT OF PAID ABSENCES

Except for CEMML & CHNP employees, vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are charged to Federal projects as part of the normal charge for salaries and wages. Separate charges for the cost of these absences are not made.

For CEMML & CHNP employees, the cost of vacation, holiday, sick leave pay, and other paid absences are included in a leave benefit rate which is applied to salaries and wages for budgeting and charging purposes for Federal projects, and are not included in direct charges for salaries and wages. Charges for salaries and wages must exclude those paid to CEMML & CNHP employees for periods when they are on vacation, holiday, or sick leave, or are otherwise absent from work.

DEFINITION OF OFF-CAMPUS
For projects which include activities conducted at both on- and off-campus sites, the following criteria will determine costs to be allocated as off-campus: Must extend over a period of more than 120 consecutive days (or the duration of the project, if less than 120 days) at the off-campus site.

DEFINITION OF EQUIPMENT
Equipment is defined as tangible nonexpendable personal property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit.

This rate agreement updates the fringe benefits only.

ORGANIZATION: Colorado State University Business and Financial Services

AGREEMENT DATE: 07/20/2012

SECTION III: GENERAL

A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted: such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Office of Management and Budget Circular A-21 Circular, and should be applied to grants, contracts and other agreements covered by this Circular, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:	ON BEHALF OF THE FEDERAL GOVERNMENT:
Colorado State University Business and Financial Services	DEPARTMENT OF HEALTH AND HUMAN SERVICES
(INSTITUTION)	(AGENCY)
(SIGNATURE)	(SIGNATURE)
David Ryan	Arif Karim
(NAME)	(NAME)
Controller	Director, Western Field Office
(TITLE)	(TITLE)
8/1/2012	7/20/2012
(DATE)	(DATE) 1001

HHS REPRESENTATIVE: Robert Lee

Telephone: (415) 437-7820

Colorado State University
Director and University Controller
Business and Financial Services
6003 Campus Mail
555 S. Howes St.
Fort Collins, CO 80523-6003
(970)491-6694
FAX: (970)491-2253

DATE: July 19, 2012

TO: Deans, Directors, Department Heads, Administrative Assistants and Departmental Secretaries

FROM: Gail Michaud, Associate Controller, Fiscal Operations

SUBJECT: Approved Fringe Benefit Rates

We have received an email from the federal government approving the fiscal year 2013 University Fringe Benefit Rates. For fiscal years beyond FY 2014, the average fringe rate increase is estimated at 1.4% per year, except for Student Hourly, of which the average increase is estimated at 0.1%.

Fringe Class	**FY 2013 Approved Rates**	FY 2014 Estimated Rates		
Faculty/Administrative Professional/ 2nd Year Post Docs & Interns	**24.1%**	24.9%	25.3	25.6
State Classified	**33.1%**	33.7%		
Student Hourly	**1.0%**	1.0%		
Non-Student Hourly	**17.7%**	17.7%		
Graduate Students	**5.1%**	5.5%		
1st Year Post Docs & Interns	**9.2%**	9.3%		
Temp 1st Year Faculty & Admin Pro*	**2.2%**	2.3%		

*This includes first year temporary Faculty and Administrative Professionals and continuing temporary Faculty and Administrative Professionals at less than 50% time.

For questions regarding the Fringe Benefit Rates, please contact Gail Michaud at 491-7134

Attachments: Benefits Chart
Rates by Percentages

OMB Number: 4040-0004
Expiration Date: 03/31/2012

Application for Federal Assistance SF-424

* 1. Type of Submission:	* 2. Type of Application:	* If Revision, select appropriate letter(s):
☐ Preapplication	☒ New	
☒ Application	☐ Continuation	* Other (Specify):
☐ Changed/Corrected Application	☐ Revision	

* 3. Date Received:	4. Applicant Identifier:
12/05/2012	115688

5a. Federal Entity Identifier:	5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: Colorado State University

* b. Employer/Taxpayer Identification Number (EIN/TIN):	* c. Organizational DUNS:
84-6000545	7859796180000

d. Address:

* Street1:	200 W. Lake Street
Street2:	
* City:	Fort Collins
County/Parish:	
* State:	CO: Colorado
Province:	
* Country:	USA: UNITED STATES
* Zip / Postal Code:	80521-4593

e. Organizational Unit:

Department Name:	Division Name:
CIRA	

f. Name and contact information of person to be contacted on matters involving this application:

Prefix:		* First Name:	Loretta
Middle Name:			
* Last Name:	Wilson		
Suffix:			

Title:

Organizational Affiliation:

* Telephone Number:	970-491-8423	Fax Number:	

* Email: loretta.wilson@colostate.edu

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

H: Public/State Controlled Institution of Higher Education

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Department of Commerce

11. Catalog of Federal Domestic Assistance Number:

11.459

CFDA Title:

Weather and Air Quality Research

*** 12. Funding Opportunity Number:**

NOAA-OAR-OWAQ-2013-2003469

* Title:

FY 2013 Joint Hurricane Testbed

13. Competition Identification Number:

2297052

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Empirical-dynamical Modeling of Tropical Cyclone Structure Evolution

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: CO-002 | b. Program/Project: CO-002

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 08/01/2013 | * b. End Date: 07/31/2015

18. Estimated Funding ($):

* a. Federal	24,000.00
* b. Applicant	0.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	24,000.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: | * First Name: Linda

Middle Name:

* Last Name: Loing

Suffix:

* Title: Research Administrator

* Telephone Number: 970-491-6586 | Fax Number:

* Email: Linda.Loing@colostate.edu

* Signature of Authorized Representative: Linda Loing | * Date Signed: 12/05/2012

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 06/30/2014

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. FY 2013 Joint Hurricane Testbed	11.459	$	$	$ 24,000.00	$	$ 24,000.00
2.						
3.						
4.						
5. Totals		$	$	$ 24,000.00	$	$ 24,000.00

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SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1)	(2)	(3)	(4)	Total (5)
	FY 2013 Joint Hurricane Testbed	N/A			
a. Personnel	$ 7,194.00	$ 7,175.00	$	$	$ 14,369.00
b. Fringe Benefits	1,805.00	1,836.00			3,641.00
c. Travel					
d. Equipment					
e. Supplies					
f. Contractual					
g. Construction					
h. Other	232.00	220.00			452.00
i. Total Direct Charges (sum of 6a-6h)	9,231.00	9,231.00			$ 18,462.00
j. Indirect Charges	2,769.00	2,769.00			$ 5,538.00
k. TOTALS (sum of 6i and 6j)	$ 12,000.00	$ 12,000.00	$	$	$ 24,000.00
7. Program Income	$	$	$	$	$

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SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8.	$	$	$	$
9.				
10.				
11.				
12. TOTAL (sum of lines 8-11)	$	$	$	$

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 12,000.00	$ 12,000.00	$	$	$
14. Non-Federal	$				
15. TOTAL (sum of lines 13 and 14)	$ 12,000.00	$ 12,000.00	$	$	$

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. N/A	$ 12,000.00	$	$	$
17.				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	$ 12,000.00	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: 18,462

22. Indirect Charges: 5,538

23. Remarks:

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OMB Number: 4040-0007
Expiration Date: 06/30/2014

ASSURANCES - NON-CONSTRUCTION PROGRAMS

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C.§§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U. S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

* SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	* TITLE
Linda Loing	Research Administrator
* APPLICANT ORGANIZATION	* DATE SUBMITTED
Colorado State University	12/05/2012

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FORM **CD-511**
(REV 1-05)

U.S. DEPARTMENT OF COMMERCE

CERTIFICATION REGARDING LOBBYING

Applicants should also review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 28, 'New Restrictions on Lobbying.' The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of Commerce determines to award the covered transaction, grant, or cooperative agreement.

LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000 or a loan or loan guarantee over $150,000 as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying.' in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

In any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, 'Disclosure Form to Report Lobbying,' in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification.

* NAME OF APPLICANT

Colorado State University

* AWARD NUMBER

TBD

* PROJECT NAME

Empirical-dynamical Modeling of Tropical Cyclone Structure

Prefix:

* First Name: Linda

Middle Name:

* Last Name: Loing

Suffix:

* Title: Research Administrator

* SIGNATURE: Linda Loing

* DATE: 12/05/2012