UNIVERSITY AT ALBANY
State University of New York

Written Testimony for:
Dr. Chris Thorncroft, University at Albany
Joint Legislative Budget Hearing on Economic Development
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On behalf of the University at Albany, State University of New York, I would like to thank Chairpersons Assemblymember Robin Schimminger and Senator Anna Kaplan, and the entire committee, for the opportunity to address you today about the University's NYSTAR Center of Excellence in Atmospheric and Environmental Prediction and Innovation.

I would also like to take this opportunity to thank the Governor and State Legislature for this Center's designation, and our representatives, Assemblymember Pat Fahy her leadership and support in helping to secure $250,000 in seed funding for this Center four years ago, to both Senator Neil Breslin and Assemblymember Fahy for their continued support in securing this funding each year since. We aspire to be fully funded at the $1M level in the near future, a level on par with the majority of our sister Centers of Excellence across the State.

I am Dr. Chris Thorncroft, Interim Director of the Atmospheric Sciences Research Center, and Director of the Center of Excellence in Atmospheric and Environmental Prediction and Innovation at the University at Albany. Joining me today is my colleague, Jan Woodcock, Executive Director of Weather Innovation at UAlbany's Center of Excellence. UAlbany boasts an internationally acclaimed Atmospheric and Environmental Sciences program with a nearly 60 year history of academic excellence and service to the State of New York. Indeed, UAlbany is home to the largest concentration of atmospheric scientists in New York State and one of the largest and most prominent in the country.

Designated an NYSTAR Center of Excellence (COE) in 2015, UAlbany's Center of Excellence in Atmospheric and Environmental Prediction and Innovation is the State's entrepreneurial hub for a network of 120 weather and climate faculty, researchers and research staff based at UAlbany. Together, these leading scientists are deeply engaged in advancing innovative weather and climate research applications with a variety of New York based industries representing utilities, renewable energy, emergency management, transportation, drones, to name a few. They work with industry partners to solve R&D problems, return economic benefits, create new jobs, and retain current jobs from leaving New York State. Through the Center of Excellence, businesses have direct access to arguably the most advanced weather and climate industry-focused ecosystem in the nation. Along with UAlbany's leading faculty scholars and researchers, this ecosystem includes extraordinary capability including:

- **The New York State Mesonet,** is the nation's gold standard of weather observation systems capturing over 500,000 real-time observations each day. Championed by Governor Cuomo in 2014, the NYS Mesonet is a key resource for UAlbany's Center of Excellence with its network of 180 weather stations across New York with one in every county. The Mesonet is helping to keep New Yorkers safe with the most advanced early warning weather-detection system in the country, and is a compelling source of data for weather sensitive industries. Each station is equipped with automated sensors that collect observations every 5 minutes on temperature, humidity, wind speed and direction, solar radiation, atmospheric pressure, snow depth and soil temperature and moisture. The data are transmitted to a central facility at UAlbany, where they are quality controlled, processed and sent to emergency managers, utilities, ground and air transportation facilities, farms and other weather-sensitive businesses across New York for use in forecasting and decision-making.

- The **Emerging Technologies and Entrepreneurship Complex** – a new state-of- the-art R&D facility which is currently under construction, will serve as the new home of our entire weather enterprise in 2020. Approved by the Governor, this truly pioneering 240,000 sq ft R&D facility will for the first time co-locate under one roof our Atmospheric Sciences Research Center, the Department of Atmospheric and Environmental Sciences, the Department of Environmental & Sustainable Engineering, the NYS Mesonet Operations Center, the xCITE Visualization Lab, the Calibration Laboratory, and potentially amendable space for the Weather Industry and the National Weather Service.

- **Dozens of public private partnerships with weather sensitive organizations** are a part of our weather enterprise, including a more than 25-year partnership with the National Weather Service – currently co-located with our Atmospheric Science Research Center.

- **And finally UAlbany's Weather Enterprise has attracted more $120 million in extramural funding** for weather and climate related research over the past 15 years, culminating with a record year in 2018. This funding feeds exciting, new research and development which our Center of Excellence is leveraging to work with both current and prospective P3 partners.

This weather analytics ecosystem is truly unprecedented, and moreover is located in a state where weather matters to the bottom-line of New York State business and industry a great deal.

In fact, weather affects consumers and businesses thereby impacting our state and national economies. In NYS alone, $142B in economic activity is affected by variations in humidity, wind, snow,

and other weather related occurrences. New York is one of the most economically vulnerable states in the US to extreme weather.

U.S. Weather disruptions costs have been estimated at $630 billion or 3.5% of the GDP. In the past, research has been inadequate to provide public and private organizations actionable understanding of weather risk. Businesses who can harness the power of better weather and climate information can increase profits resulting in positive economic impacts in NYS. The Center of Excellence drives innovation in the use of weather information in public and private organizations, helping them manage weather risk. These innovative weather solutions grow businesses, create jobs and drive the economy of NYS. Although our COE is only 4 years, old the Center has made great progress in establishing impactful industry partnerships. The COE puts weather solutions into the hands of industry partners across the state to empower them to make smarter weather risk management decisions in advance of high impact weather events.

Example Clients:

- **IBM:** IBM and the University at Albany (UAlbany) have launched a pioneering partnership to build a national leading, dynamic weather smart solutions ecosystem featuring the establishment of a Center for Next Generation Weather Smart Solutions. This center will serve as an R&D hub to transform the weather ecosystem in New York State, nationwide and around the globe as we know it. Given the daily importance that weather plays in securing public safety and driving a thriving economy, IBM and UAlbany are bringing together our internationally recognized scientists and physical infrastructure to develop smart weather solutions spanning a number of sectors including emergency management, transportation, energy, public health, finance and agriculture.

- **Utilities:** UAlbany's COE is currently working with several utility companies. Weather affects utility companies in many ways but these projects are concerned with the development of "outage models." Ahead of an impending severe weather event - they want to know what the risk is of power outages and how to mitigate through prevention or repair. Ahead of such a storm these companies have to make decisions on how many repair crews to have standing by and where they should be – how much overtime will need to be paid and whether additional crews from out of state need to be brought in. The COE has created tools that help utility companies make these decisions more accurately, thus keeping the power on and saving money, and jobs in NYS.

- **NYISO:** UAlbany's COE is also working with NYISO facilitating Mesonet data transfer and conducting discussions regarding renewable energy prediction. Increased understanding of

Solar and Wind transmission productivity will be important to grid management as we approach NYS's goal of 100% clean carbon-free electricity by 2040.

- **Fortune 100 Company**: The COE is working with a world leader in power controls technology and solutions. This Fortune 100 Company and the UAlbany Weather Enterprise are in partnering discussions to develop advanced controls solutions for microgrid renewables management. Solar and Wind transmission understanding is a critical component of renewables electric power productivity affecting micro-grid and grid management.

- **Airlines**: The COE is currently in discussions with a national Airline to improve their plane travel forecasts, helping predict events such as fog, turbulence, rain, snow, etc.

- **Rail**: The COE is working with commuter rail to support decisions regarding safety, scheduling, and staffing by using better weather prediction. The COE has built an "alpha" Risk Prediction Tool which forecasted weather risks for a recent major winter storm.

- **Highway**: The COE is currently helping NYS Thruway evaluate weather/road conditions during lake effect snow events on the NYS Interstate Route 90 region. Weather stations have been installed creating new detailed weather observations. Weather operational impact research is ongoing to help improve travel.

- **BOCES School Closing Management**: The COE is working with Capital Region BOCES to aid them in making better weather dependent school closing/opening/delay decisions. The goal is to help these districts have better tools at their disposal when making these decisions, thus improving safety of NYS's children. Schools also save money that is lost when a school is incorrectly closed due to an inaccurate weather forecasts, or incorrectly stays open, causing safety risks to students and staff.

These are just a few examples of the exceptional work being done by UAlbany's Center of Excellence. We believe we are living up to the promise of the Center of Excellence program by combining our research expertise, core facility assets and a business development team comprised of individuals with a combined 50 plus years of business development and management experience to help existing New York companies succeed and create new businesses. We appreciate the state's investment to date and believe that with even greater state and industry support, we expand the industry clusters we serve while creating and retaining more jobs.

In short, what we are building in New York State is truly extraordinary. Our Center of Excellence is not only fostering a smart weather solutions ecosystem that will be second to none in the country, it

is laying the foundation to transform weather into one of New York's most dynamic, high impact, and job creating economies.

Before we close today, I would like to take this opportunity to personally invite each of you to visit our Center of Excellence and Weather Enterprise at the University at Albany which is just down the road. Again, we have a Mesonet station in every county in New York State and we would be pleased to show you firsthand how your constituencies are benefiting in your district

Once again, thank you for the opportunity to present our Center of Excellence progress today. We look forward to our working with you in the weeks and months ahead as we strive to continue to accelerate weather smart economic growth in the State of New York.

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Chris Thorncroft received his Ph.D. from the University of Reading (U.K.) in 1988. He is a Professor in the Department of Atmospheric and Environmental Sciences, at the University at Albany, SUNY. His research is concerned with improving our understanding of the processes that determine the nature and variability of the West African monsoon system, including how this impacts Atlantic tropical cyclones. The research spans a wide range of timescales from diurnal-to-multidecadal and including climate change.