## **CURRENT AND PENDING (OTHER) SUPPORT INFORMATION**

Provide the following information for the Senior/key personnel and other significant contributors. Follow this format for each person.

\*NAME: Delene, David James

PERSISTENT IDENTIFIER (PID) OF THE SENIOR/KEY PERSON: https://orcid.org/0000-0002-3733-6021

\*POSITION TITLE: Research Professor and Aerospace Research Fellow

\*ORGANIZATION AND LOCATION: University of North Dakota, Grand Forks, North Dakota, United States

### Proposals/Active Projects

*Proposal/Active Project Title:	Atmospheric Methane Observations and Analysis in Western North Dakota
*Status of Support:	Current
Proposal/Award Number:	
*Source of Support:	Department of Energy
*Primary Place of Performance:	Grand Forks, ND
*Proposal/Active Project Start Date: (MM/YYYY):	01/2025
*Proposal/Active Project End Date: (MM/YYYY):	09/2027
*Total Anticipated Proposal/Project Amount:	\$714,703

\* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2025	1.13
2026	2.13
2027	1.13

\*Overall Objectives: A research aircraft is used for a field deployment in the time frame of 2025-2026 to obtain methane concentrations and atmospheric conditions in the oil and gas development area near Williston, North Dakota. A top-down estimate of methane emissions using a mass balancing technique is applied to the collected data set.

\*Statement of Potential Overlap: None.

\*Proposal/Active Project Title: Improving North Dakota Thunderstorm Forecasting using Machine Learning Neural Network \*Status of Support: Current

**Proposal/Award Number:** 

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### \*Source of Support: State of North Dakota

# \*Primary Place of Performance: Grand Forks, North Dakota

\*Proposal/Active Project Start Date: (MM/YYYY): 08/2024

\*Proposal/Active Project End Date: (MM/YYYY): 06/2025

**\*Total Anticipated Proposal/Project Amount:** \$131,892

# \* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2025	0.5

\*Overall Objectives: To use boundary layer observations to improve forecasting of Thunderstorm on short time scales.

\*Statement of Potential Overlap: None.

*Proposal/Active Project Title:	Summer and Fall 2023 Saudi Arabia Field Project and Analysis (Including Extension I)
*Status of Support:	Current
Proposal/Award Number:	
*Source of Support:	National Center of Meteorlogy and Environment
*Primary Place of Performance:	Grand Forks, North Dakota

\*Proposal/Active Project Start Date: (MM/YYYY): 07/2023

\*Proposal/Active Project End Date: (MM/YYYY): 06/2025

\*Total Anticipated Proposal/Project Amount: \$449,995

\* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2023	2
2024	4
2025	2

\*Overall Objectives: The University of North Dakota is supporting the Saudi Aerosol-Cloud-Precipitation Enhancement Campaign (SARPEC) series of field projects, which aims to determine the effectiveness of operational cloud seeding techniques for rainfall augmentation within the arid climates of the Kingdom of Saudi Arabia.

\*Statement of Potential Overlap: None.

*Proposal/Active Project Title:	Investigating the Formation and Impacts of Ice Crystal Aggregates on Hypersonic Vehicles
*Status of Support:	Current
Proposal/Award Number:	
*Source of Support:	Office of Naval Research
*Primary Place of Performance:	Grand Forks, North Dakota
*Proposal/Active Project Start Date: (MM/YYYY):	02/2023
*Proposal/Active Project End Date: (MM/YYYY):	01/2026
*Total Anticipated Proposal/Project Amount:	\$750,000

* Person Months per budget period Devoted to the Proposal/Active P	vroject:
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Year	Person Months
2023	0.75
2024	1
2025	0.25

\***Overall Objectives:** The research goal is to create a new method to assess ice aggregate impacts to hypersonic vehicles, which involved understanding the bonding strength of monomers that make up ice crystal aggregates and how they pass through hypersonic boundary layers.

\*Statement of Potential Overlap: None.

*Proposal/Active Project Title:	Collaborative Research: Comparison between In-situ and Polarimetric Radar Hail Observations in Convective Storms
*Status of Support:	Current
Proposal/Award Number:	
*Source of Support:	National Science Foundation
*Primary Place of Performance:	Grand Forks, North Dakota
*Proposal/Active Project Start Date: (MM/YYYY):	08/2022
*Proposal/Active Project End Date: (MM/YYYY):	07/2025

\*Total Anticipated Proposal/Project Amount: \$277,610

\* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2022	0.5
2023	1
2024	1

Year	Person Months
2025	0.5

\*Overall Objectives: The objective is to document the in-situ hail observations with the polarimetric radar signatures and use the aircraft hail observations to compute expected polarimetric radar signatures and compare them to actual radar signatures observed from the same storm volume. Varying the approximations and parameters used in the calculations and comparing the calculated to the actual radar returns will provide insight into how hail shapes, orientation, sizes and concentrations influence radar signatures. The key aspect of this proposal is the comprehensive analysis of a large volume of airborne in situ hail data from 18 missions conducted during 9 different campaigns, that have not been analyzed so far.

\*Statement of Potential Overlap: None.

*Proposal/Active Project Title:	IMPACTS (Investigation of Microphysics & Precip for Atlantic Coast-Threatening Snowstorms)
*Status of Support:	Current
Proposal/Award Number:	80NSSC19K0328
*Source of Support:	National Aeronautics and Space Administration
*Primary Place of Performance:	Grand Forks, North Dakota
*Proposal/Active Project Start Date: (MM/YYYY):	01/2019
*Proposal/Active Project End Date: (MM/YYYY):	12/2025
*Total Anticipated Proposal/Project Amount:	\$1,106,088

\* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2023	2
2024	1
2022	1
2021	0.25
2020	1
2019	1

\*Overall Objectives: The University of North Dakota is responsible for the acquisition and processing of data from the cloud microphysics probes, which are mounted on the NASA P-3 aircraft.

\*Statement of Potential Overlap: None.

\*Proposal/Active Project Title: Expendable Air-sea Profiling Observations in Hazardous Weather Conditions

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# \*Status of Support: Pending

### Proposal/Award Number: N25A-T025

\*Source of Support: DOD NAVY STTR

\*Primary Place of Performance: Grand Forks, North Dakota

\*Proposal/Active Project Start Date: (MM/YYYY): 08/2025

\*Proposal/Active Project End Date: (MM/YYYY): 10/2026

\*Total Anticipated Proposal/Project Amount: \$96,000

\* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2025	1
2026	1

\*Overall Objectives: Hazardous situations, such as severe storms and blizzards, require vertical profiling for data collection and proper research. Given the hazardous conditions, it is often difficult to do without specialized aircraft or costly balloon equipment. Access to expendable balloon-based equipment would reduce these costs, allowing for more frequent data collection during hazardous events, and expanding data resources for further potentially lifesaving research. One expendable measurement not currently available on standard radiosondes is the horizontal temperature difference, which enables the calculation of optical turbulence. A thermocouple is an inexpressive sensor that can be added to expendable radiosondes to obtain high-precision temperature difference measurements even under hazardous conditions.

#### \*Statement of Potential Overlap: None

*Proposal/Active Project Title:	Research Infrastructure: MRI: Track 1 Acquisition of Pyrolysis-Gas Chromatograph with a High-Resolution Mass Spectrometer (Pyr-GC-HR-MS)
*Status of Support:	Pending
Proposal/Award Number:	
*Source of Support:	National Science Foundation
*Primary Place of Performance:	University of North DAkota
*Proposal/Active Project Start Date: (MM/YYYY):	07/2025

\*Proposal/Active Project End Date: (MM/YYYY): 06/2028

\*Total Anticipated Proposal/Project Amount: \$804,139

# \* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2026	2
2027	2

Year	Person Months
2028	2

\*Overall Objectives: Obtain observations of the chemistry of atmospheric aerosols for several fog event to determine effects on fog formation, duration and dissipation.

\*Statement of Potential Overlap: None.

\*Proposal/Active Project Title:

\*Proposal/Active Project Title:
Improved Representation of the Microphysical Processes for Droplet Formation during Fog Events over Non-Mountainous, Continental Locations.

\*Status of Support:
Pending

Proposal/Award Number:
\*Source of Support:

\*Source of Support:
National Science Foundation

\*Primary Place of Performance:
Grand Forks, North Dakota

\*Proposal/Active Project Start Date: (MM/YYY):
05/2025

\*Proposal/Active Project End Date: (MM/YYY):
04/2028

\*Total Anticipated Proposal/Project Amount:
\$709,373

 Year
 Person Months

 2025
 1.6

 2026
 1.6

 2027
 1.6

\*Overall Objectives: The proposed project develops an innovative aerosol activation methodology designed to deepen our understanding of fog microphysical processes. By integrating local cooling rates and water vapor flux, the proposed research can significantly enhance the evaluation of aerosol activation processes, in moving beyond traditional relationships that rely solely on updraft velocity and fail to capture the complex interactions between aerosols and local humidity conditions. The developed methodology enables a detailed representation of droplet activation by capturing the conditions that facilitate droplet formation and growth, leading to more reliable fog forecasts.

\*Statement of Potential Overlap: None

 \*Proposal/Active Project Title: Markov-Chain Radiative Transfer Formalism for Investigating Cloud Microstructure with LiDAR
 \*Status of Support: Pending
 Proposal/Award Number:

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\*Source of Support: National Aeronautics and Space Administration

\*Primary Place of Performance: Grand Forks, North Dakota

\*Proposal/Active Project Start Date: (MM/YYYY): 05/2025

\*Proposal/Active Project End Date: (MM/YYYY): 04/2028

\*Total Anticipated Proposal/Project Amount: \$579,225

# \* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2026	0.5
2027	0.5
2028	0.5

\*Overall Objectives: To use Markov-chain radiative transfer to develop an improved formalism of LIDAR observations of cloud micro-structure as indicated by in-situ observations.

\*Statement of Potential Overlap: None.

*Proposal/Active Project Title:	Unveiling Ice Crystal Chain Aggregates in Winter Storms: Contextualization using In-situ and Remote- sensing Observations
*Status of Support:	Pending
Proposal/Award Number:	
*Source of Support:	National Aeronautics and Space Administration
*Primary Place of Performance:	Grand Forks, North Dakota
*Proposal/Active Project Start Date: (MM/YYYY):	03/2025
*Proposal/Active Project End Date: (MM/YYYY):	02/2027
*Total Anticipated Proposal/Project Amount:	\$399,995

#### \* Person Months per budget period Devoted to the Proposal/Active Project:

Year	Person Months
2026	3
2027	3

\*Overall Objectives: The project's aim is to advance the understanding of the aggregate formation process by creating a storm relative location map of chain aggregates. The project uses the cloud probe, in-situ measurements (CPI, PHIPS, 2D-S, HVPS3 probes) on the P-3 aircraft to determine the amount of chain and non-chain aggregates observed. Remote sensing observations (CPL, CRS, EXRAD, ground radar, and GOES 16) are used to put the location into the larger context of the winter storm. By utilizing the complete IMPACT field project dataset, a storm relative map of chain aggregates is developed. The chain aggregate location map enables conceptual testing of different possible formation processes.

# \*Statement of Potential Overlap: None.

# **Certification:**

I certify that the information provided is current, accurate, and complete. This includes but is not limited to current, pending, and other support (both foreign and domestic) as defined in 42 U.S.C. § 6605.

I also certify that, at the time of submission, I am not a party to a malign foreign talent recruitment program.

Misrepresentations and/or omissions may be subject to prosecution and liability pursuant to, but not limited to, 18 U.S.C. §§ 287, 1001, 1031 and 31 U.S.C. §§ 3729-3733 and 3802.

Certified by Delene, David in SciENcv on 2025-02-05 10:48:43