U.S. COAST GUARD ACADEMY

Annual Report *of* Research

Office of Scholarship, Research and Innovation

FALL 2025

USCGA

Office of Scholarship, Research and Innovation

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FALL 2025

"The Coast Guard must not simply evolve. It must revolutionize how it functions and operates to ensure a decisive advantage over adversaries. The Coast Guard will shift from a reactive posture to a proactive strategy that relies on innovation. It will anticipate the Nation's needs and develop and field cutting-edge technologies to meet them."

– DHS Secretary Kristi Noem

"The best way to predict the future is to create it."

– Alan Kay, Turing Award Laureate

We here at the U.S. Coast Guard Academy create the future. Our mission is to educate, train, develop and inspire the next generation of leadership for the U.S. Coast Guard and for the Nation. That future is almost assuredly characterized by accelerating change, new technology, and new challenges we have yet to imagine.

Our service will need to invent and implement new technology, operate differently, and proactively adjust to a changing operational environment. Successful leaders will be those who can innovate and generate new insights. Where better and who better to do this work than our Academy and our cadets — the future leaders who will use that technology and adapt to that new knowledge? In these pages you will find shining examples of our faculty, staff, and importantly, our cadets doing exactly that, creating our future through innovation. I hope you will find it as inspiring as I do!

CAPT Gregory J. Hall, Ph.D.
Vice Provost for Research
Office of Scholarship, Research and Innovation

Credit: Brad Clift

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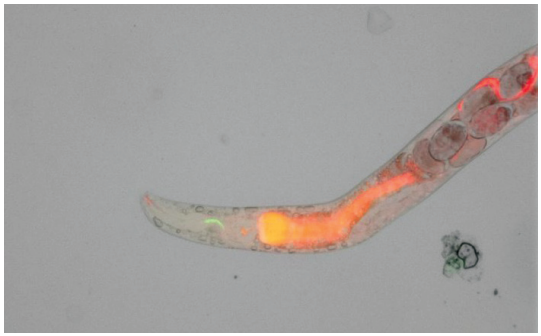
RESEARCH HIGHLIGHTS

Dr. Joshua Gray Awarded Grant from the National Science Foundation

Biological research at the Coast Guard Academy received a major boost this year thanks to the National Science Foundation (NSF), which awarded a grant to a multi-institutional team of faculty working to further undergraduate education in toxicology, biochemistry, and related fields.

Led by Dr. Joshua Gray, Department of Chemical and Environmental Sciences, the team of six faculty investigators secured nearly $400,000 to design, develop, incorporate, and assess teaching materials that help faculty integrate authentic research experiences into undergraduate science courses. Co-investigators include faculty from Washington College (Maryland), Lincoln Memorial University (Tennessee), Husson University (Maine), the University of Maine, and the Medical University of South Carolina.



C. elegans. Credit: Joshua Gray

Gray's approach leverages the nationally recognized Course-based Undergraduate Research Experience (CURE) methodology, which involves students conducting original research with faculty mentors in the context of traditional biology courses. To support this work, the faculty team will develop several laboratory modules focused on understanding biological stress in *Caenorhabditis elegans (C. elegans)*, a free-living transparent nematode (roundworm) about 1 mm in length.

The worm is relatively easy to care for in the laboratory, making it a convenient organism for students to work with while learning to carry out scientific research. It also serves as a model system for scientists seeking to understand how stress can affect an organism's ability to survive, grow, and reproduce. Biological stress includes any disturbance to the resting state of an organism by any internal or environmental factor, such as a chemical, light, food, or even genetic differences. It is something all living organisms experience, so

understanding it is a subject of universal interest to scientists. It also features prominently in the name of the project: StressCURE.

Over the next three years, the investigators will develop laboratory modules focusing on techniques that undergraduate students from the six collaborating institutions will use to learn to develop hypotheses, carry out laboratory experiments, analyze data, and draw conclusions based on their results. Gray and the team will use these opportunities to develop and test new teaching modules that help other faculty members build laboratory courses that promote authentic undergraduate research experiences using *C. elegans*.

Although the modules have direct connections to subjects often taught in general biology, molecular biology, biochemistry, and neuroscience courses, Gray emphasizes that the research skills students learn are transferable to virtually any discipline and are vital to a robust undergraduate STEM education. “Peer reviewed research shows that students exposed to research early in their education have higher retention in science,” he says. “They perform better academically, are more resilient to failure, and develop a stronger sense of scientific identity."

In the first eight months of the study, the team has already produced eight self-contained teaching modules that are publicly available through the study’s website, stresscure.org. Some topics include *Basic Worm Picking, Recipes for C.* elegans *Culturing, Basal Slowing Response*, and *Aversion Assay*. The goal is to produce at least twenty-two more.

Gray examines *C. elegans* under the microscope in the Biochemistry Lab in Smith Hall. Credit: PA2 Janessa Warschkow

Funding from NSF over the three-year study will also be used to purchase laboratory supplies, host collaborator workshops, present findings at professional conferences, and publish in peer-reviewed journals. In addition, the team hired a program evaluator to assist in determining how successful the teaching modules are in helping students achieve established learning outcomes.

Gray and colleagues have presented their work at the 2025 Society of Toxicology meeting in Orlando, Florida. Asked about highlights of the experience so far, Gray is quick to say that, besides working with students, the best part is “knowledge sharing” — the opportunity to develop teaching materials with colleagues who are passionate about undergraduate research and to share the modules with other interested faculty.

> Research shows that students exposed to research early in their education have higher retention rates in science.

Credit: PA3 Matt Thieme

Artificial Intelligence Soars in the Mathematics Department

The Mathematics Department made significant progress this year in incorporating artificial intelligence (AI) into research, teaching, and learning at the Coast Guard Academy. Buoyed in part by funding from the National Security Agency, the faculty undertook projects ranging from collaborative research on image denoising using deep learning techniques to research on generative AI (GenAI) in the multicalculus classroom, further exploring its potential for higher education.

Deep learning for image denoising

On the research side, Dr. Arundhati Bagchi Misra and her colleague, Dr. Kathy Krystinik, initiated novel work into AI-assisted digital image denoising. They are developing a better technique for extracting useful information from images made unclear by pixel imperfections caused by interference from glare, motion, or dropped signals at the time a picture is taken.

Image denoising has many real-world applications, since it makes objects in an image easier to see. For example, anyone who has seen a medical ultrasound image can appreciate how removing background noise could produce a clearer image. Image denoising is also used to clarify objects in satellite imagery to, for example, assess the scope of local damage following a natural disaster.

How does an AI-assisted approach to image denoising differ from traditional methods? Traditional image denoising uses partial differential equations (pde) and filtering-based models. The former uses complex equations and iterative calculations to assign new color values to problematic pixels, which tends to smooth out the image and create a blurring effect. The latter method updates the noisy pixels based on the color value of surrounding pixels.

Bagchi Misra has used traditional methods in the past, but recent conversations with Krystinik inspired her to try a different approach, one that employs a machine learning technique called deep learning. The technique involves training a computer model to recognize pixels that contribute to visual noise in an image. Bagchi Misra and Krystinik start with multiple copies of a single clean image and add artificial noise (random pixels) to some. They use these images as a training and testing data set, using Neural Network models to “teach” the computer which pixels are problematic. This allows the model to “learn” the characteristics of clean images. Once the model is trained, Bagchi Misra and Krystinik provide the model with new clean and noisy images. The model removes noisy pixels until it minimizes the error function between both types of images. The result is that the noisy image is made crystal clear...at least in theory.

This year, Bagchi Misra focused on testing the performance of different image denoising models on black-and-white photographs. First, she introduced a random distribution of noisy pixels to an otherwise clear image, making the image unclear (noisy). She then applied two image denoising models in Python programming

language, each based on deep-learning models: Artificial Neural Network (ANN) and Convolutional Neural Network (CNN). She ran each model on the noisy image and compared how well each returned the image to its original clarity, an option not usually available in real-world applications. Model performance was also compared to that of traditional denoising models.

The results have been surprising.

Typically, denoising makes images easier to interpret, but results from the ANN model were almost too good to believe. It produced an image that, to the human eye, was remarkably similar to the original noise-free image. The CNN model performed as expected, improving the noisy image, but still leaving it less clear than the original, clean photograph. "We are trying to figure out why that would be," says Bagchi Misra.

Once the results are understood, she plans to move on to color images, which pose a greater challenge to researchers. Unlike grayscale images, which use a one-dimensional linear scale of 255 shades of gray to depict an object, color images use a three-dimensional scale of red, blue, and green layers, each with a separate shade scale. This situation calls for a model accounting for more complex, layered computations among the three color channels.

Denoising color images would expand the range of applications for Bagchi Misra's findings. She also looks forward to expanding the project by bringing cadets onboard. "Eventually," she says, "we will include cadets, a couple years down the road, once we have the techniques more worked out."

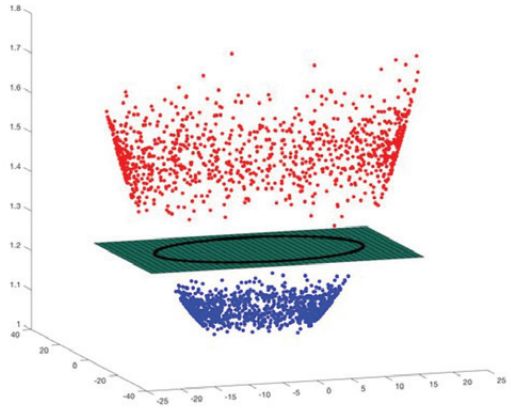
Bagchi Misra was awarded a Faculty Research Forum Fellowship during Summers 2024 and 2025 to work on this study. In April, she presented her initial findings at the American Mathematical Society meeting in Hartford, CT and at the Military Operations Research Society Symposium in Leesburg, VA.

Generative AI in the classroom

Also this year, Mathematics instructor LCDR Justin Sherman brought generative AI into the calculus classroom. Driven to equip future Coast Guard officers to work with data in general — and with generative AI (GenAI) in particular — Sherman and his colleagues developed two new data-centric, project-based lesson plans for students in Multivariate Calculus, lesson plans that include metrics for measuring student success in mastering the techniques.

The first student project took a manual approach to calculus education. Students worked with multidimensional data while learning about partial derivatives. They used a provided dataset to calculate and manually plot decision boundaries — linear or non-linear surfaces separating two or more classes of data plotted on a two- or three-dimensional axis.

In the second project, students were asked to use a GenAI model of their choice to perform the same calculation as in the first project and to produce a visual image of the plot. Most chose to use ChatGPT, but some used Gemini or a similar model. Students were asked to evaluate how AI performed in comparison to their own calculations performed in the previous project.

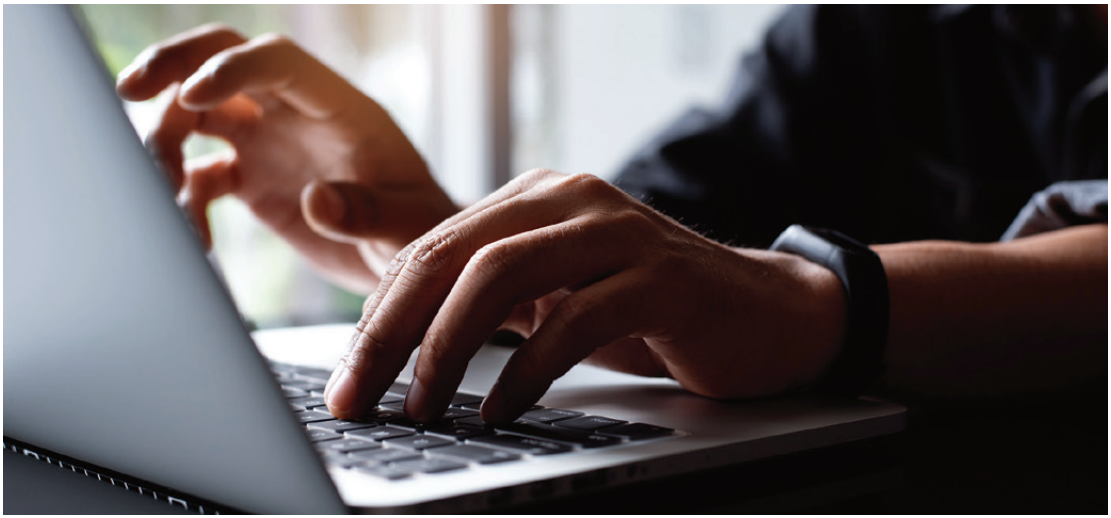


Two data classes (red, blue) plotted on a three-dimensional plot, separated by a linear decision boundary (green).

While many found that ChatGPT produced decision boundaries very similar to their own, some found the results to be quite different. Instead of curved surfaces separating two groups of data, the GenAI model calculated either a straight-line boundary or a boundary that didn't clearly separate the two data classes. In some cases, it produced an overly elaborate graph.

Reflecting on their experience, some students said they learned to ask better questions of ChatGPT and adjusted their guidance over the course of the hour to achieve better output. Some said ChatGPT was "a great partner," while others expressed disappointment in the quality of the output, noting that if they hadn't performed their own calculations first, they wouldn't know how much better the GenAI model output should be.

Sherman's hope is that exercises like these strengthen students' mathematical understanding of topics taught in class. He also believes it will help students appreciate the benefits and limits of GenAI tools and set "reasonable boundaries to how we use these tools."



> The ORDA curriculum is a natural environment for…exploration with intelligence models.

Sherman presented this work at a Faculty Research Forum Lunchtime Seminar in the Spring. He also plans to submit a paper to a peer-reviewed journal published by the Mathematical Association of America.

Looking ahead

The Mathematics Department sees these experiences as initiating a broader integration of AI theory and techniques into the curriculum at the Coast Guard Academy so that graduates will be ready to work in a world transformed by AI technology.

Faculty are also developing a framework for additional curriculum development in the field of data and GenAI literacy. The framework called Data and Artificial Insight Initiative, or DAI3, will include a suite of courses in which students explore effective, ethical, and responsible techniques for data analytics and problem solving with GenAI. The team will identify metrics for assessing student learning in these realms and craft assignments that help students implement their knowledge of AI in support of Coast Guard missions and public service.

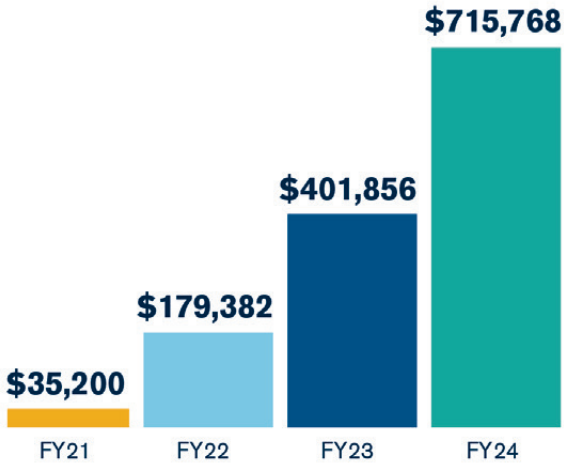
Mathematics Department Head, Dr. Jillian McLeod, says "The ORDA [Operations Research and Data Analytics] curriculum is a natural environment for impactful inquiry and exploration with intelligence models. Through these initiatives, our faculty and cadets bring the USCGA into dialogue with the rest of higher education." ●

What is SPRI?

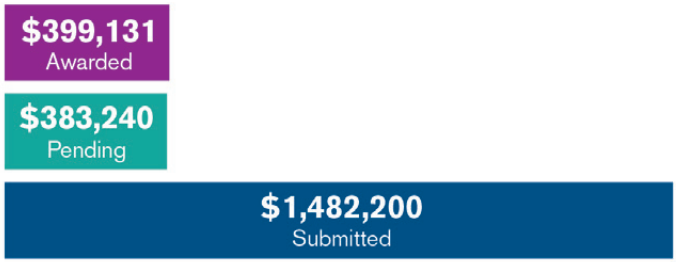
In 2018, the U.S. Coast Guard Academy signed a Cooperative Agreement with a 501(c)(3) organization that can apply for, accept, and administer research grants and funds on our behalf. That organization is the U.S. Coast Guard Academy Sponsored Projects and Research Inc. (SPRI). It was set up with the assistance of the Coast Guard Academy Alumni Association as authorized in law (14 USC 1906). The SPRI has been tremendously supportive of the Academy since its inception, and we thank them for their partnership and for the generosity of the Alumni Association in their efforts to establish and sustain this important capability to garner support for our scholarly activities.

RESEARCH BY THE NUMBERS

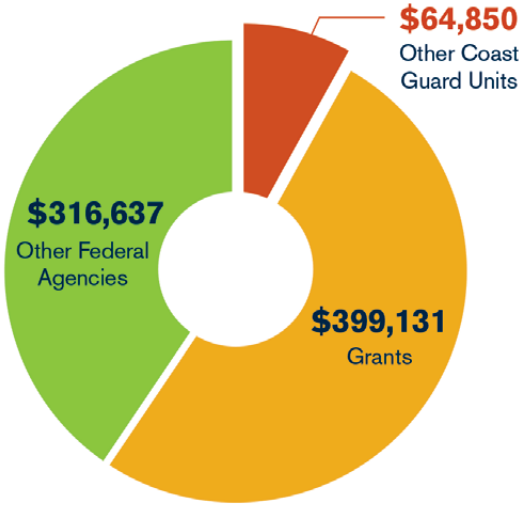
USCGA Sponsored Research Grants and Interagency Agreements



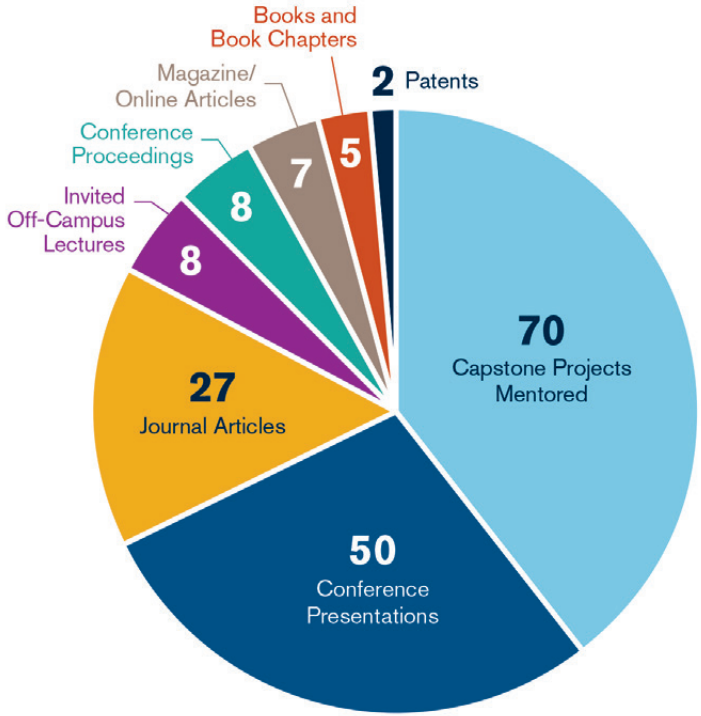
Grants FY24



External Funding Sources FY24



Faculty Scholarship 2024



PARTNERSHIP SPOTLIGHT

Partnership with MIT-Lincoln Laboratory Creates New Research Opportunities

The Coast Guard Academy has signed a new agreement with the Massachusetts Institute of Technology-Lincoln Laboratory (MIT-Lincoln Laboratory), affording new research opportunities for Academy faculty and cadets. The venture is spelled out in a Memorandum of Understanding (MOU) formally establishing how the two institutions will create collaboration opportunities for faculty, staff, and cadets in support of mutual interests.

First established in 1951 by scientists working on the national air defense system, the MIT-Lincoln Laboratory is a state-of-the-art national research and development (R&D) facility located in Lexington, Massachusetts. Today, its mission includes developing a wide range of advanced technologies in support of national security. Two of its major achievements include fabricating ground and space terminals for the fastest data downloads from a NASA moon-orbiting satellite and creating the first and highest-resolution dual-band radar in the world. The MIT-Lincoln Laboratory also operates New England's most powerful supercomputing center (see ll.mit.edu).

Dr. Zachary Kudlak, CGA Mathematics Department, embraced one of the first opportunities made possible by the new agreement: an Intergovernmental Personnel Act (IPA) arrangement. The IPA permits a federal employee to work at another host agency, with the institutions sharing salary costs.

During his sabbatical this year, Kudlak joined MIT-Lincoln Laboratory as Visiting Scientist, working with the Artificial Intelligence (AI) Technology Systems Group. He and his colleagues used machine learning and artificial intelligence to solve important problems related to national defense. Kudlak's work investigated the use of pre-trained, foundational Visual Language Models to caption and label video data.

Back on campus, Dr. Jillian McLeod and LCDR Justin Sherman mentored seven cadets working on two other research projects sponsored by the MIT-Lincoln Laboratory. One focused on AI-enabled satellite image recognition to enhance the efficiency and accuracy of buoy monitoring on the nation's coasts. The other focused on a Retrieval Augmented Generation (RAG) pipeline.

Essentially, this is a Large Language Model tailored to work with locally hosted datasets and designed to ultimately assist enlisted U.S. Coast Guard service members in studying for Service-wide Exams.

In addition to cadets conducting research in New London, seven 2/c cadets majoring in ORDA and in Electrical Engineering travelled to MIT-Lincoln Laboratory, where they worked with the AI Technology Systems Group, Advanced Imaging Group, and Laser Communications Group. Their projects involved the use of AI to caption video footage and to develop test procedures for infrared imaging and laser systems.

The Coast Guard Academy looks forward to further expanding the partnership in years to come. In the short term, Kudlak plans to return to the Academy with new cadet capstone projects furthering collaborative work with the AI Technology Group. The MOU also encourages other groups at MIT-Lincoln Laboratory with missions overlapping Academy programs to engage with Academy faculty and cadets, raising prospects for more joint opportunities in the future.

USCGA External Research Sponsors - 2024

- American Chemical Society
- Bureau of Safety and Environmental Enforcement
- Department of Energy
- Lockheed Martin
- MIT-Lincoln Laboratory
- National Geospatial-Intelligence Agency
- National Nuclear Security Administration
- National Science Foundation
- National Security Agency
- U.S. Africa Command (AFRICOM)
- U.S. Army Corps of Engineers
- U.S. Coast Guard Great Lakes Center of Expertise
- U.S. Coast Guard Office of Law Enforcement Policy and Standards Division
- U.S. Coast Guard Polar Coordination Office
- U.S. Coast Guard Research and Development Center
- U.S. Coast Guard Waterway Mobility Division
- U.S. Coast Guard Command, Control, & Navigation
- U.S. Military Academy

Faculty Research Forum Special Events

The Faculty Research Forum at the U.S. Coast Guard Academy comprises faculty and staff members passionate about supporting, promoting, and publicizing scholarly activities of the academic community. Established in 1990 as the Center for Advanced Studies (CAS), the CAS was later reorganized in 2012 and ultimately succeeded in 2023 by the Faculty Research Forum. The mission of the Faculty Research Forum is to promote interdisciplinary collaboration among faculty and cadets, foster and facilitate research through professional development opportunities, and cultivate collaboration with external partners. The Forum is dedicated to building a campus culture that encourages, supports, and celebrates faculty scholarship.

The Faculty Research Forum hosted two outstanding workshops for faculty in AY24-25 in addition to hosting the recurring Lunchtime Seminar Series (see. p. 31). Both sessions introduced faculty to concepts and software used to integrate artificial intelligence into a wide range of research subjects.

The first workshop focused on techniques for extracting information from large volumes of text. Dr. Anne Smith, University of Tennessee, Knoxville, demonstrated software that she uses to detect, characterize, and analyze emerging themes in interviews with survivors recovering from natural disasters.

Dr. Anne Smith, University of Tennessee, Knoxville
Textual data analysis approaches: from open/manual coding to AI-assisted and points in between

The second workshop provided faculty with a step-by-step demonstration of SmartPLS 4.0 software, which uses machine learning to gain insights from multivariate datasets. Dr. Joseph Hair, Jr., University of South Alabama, provided faculty with access to the software and walked us through an example of Partial Least Squares Structural Equation Modeling.

Dr. Joseph Hair, Jr., University of South Alabama
Quantitative research: Partial Least Squares Structural Equation Modeling (PLS-SEM)

Both workshops played an important role in the institution's effort to expand faculty knowledge in the areas of data analytics, machine learning, and artificial intelligence.

For more information, contact Dr. Angela Jackson-Summers.

Credit: PO2 Janessa Warschkow

CADET RESEARCH – ABOVE AND BEYOND

Newest Fulbright Scholar to Study Arctic Marine Ecology in Tromsø, Norway

The Coast Guard Academy is proud to celebrate 1/c Elise Beauchemin's selection for a prestigious Fulbright Scholarship through the Fulbright U.S. Student Program. In August 2025, Beauchemin began classes at The Arctic University of Norway (UiT) in Tromsø, where she is studying Arctic marine ecology.

ENS Elise Beauchemin (left) in Tromsø while attending the Arctic Frontiers Conference. Photo: Anthony Russell

Beauchemin is eager to begin the next chapter. “It’s a huge honor for me,” she said after learning of her selection. “I’m so excited for what the future holds.” She expressed deep gratitude for the support she received from the Coast Guard Academy’s Center for Arctic Study and Policy.CAPT (ret) Anthony Russell and Dr. Abbie Tingstad helped to shape her interests and provided invaluable mentorship. She also thanked the dedicated team of faculty, especially Dr. Karen Wink, Director of the Prestigious Scholar Program, who provided Beauchemin with guidance through every step of the rigorous application process — from crafting proposals and essays to preparing for interviews, securing recommendation letters, and identifying a thesis advisor at the host university.

With that process behind her, Beauchemin is looking forward to taking courses and conducting research. Some of her courses will include *Arctic System Ecology* and *Study Design and Data Analysis in Biology*, with electives in *Food Webs and Fisheries*, *Arctic Marine Pollution*, and *Sea Ice Habitats and Biology*.

For research, Beauchemin will investigate the potential effects of underwater vessel noise on white whales (*Delphinapterus leucas*), also known as beluga whales, and on other migratory whales. Alongside scientists at the Norwegian Polar Institute, she will conduct field work in Isfjorden, a fjord in western Norway that is vital habitat for migrating whales and heavily used for maritime commerce.

The team plans to use drones to carefully deploy minimally invasive cameras and sensors on whales to track changes in their behavior and physiology in the presence of vessel traffic. Beauchemin’s findings will provide critical data for authorities evaluating ways to mitigate disturbance to whales by establishing safe vessel approach distances, speed regulations, or traffic lanes.

In addition to learning about science, Beauchemin is excited to experience the culture of Norway. She has begun to learn some Norwegian phrases to, in her words, “experience the joy of shared cultural understanding provided by the Fulbright Program.”

She is also eager to expand her perspectives on the Arctic region in ways that benefit the Coast Guard. “There is so much to learn from Norway’s leadership in Arctic marine system ecology [that can help us] understand ecological stress from human impacts.” After completing her graduate studies, Beauchemin will be stationed in Sitka, Alaska, where she plans to continue to focus on environmental protection and Arctic missions.

First on the agenda, however, is a flight to Oslo in August, then two weeks of field work in Svalbard, Norway, one of the world’s northernmost settlements. Svalbard is also a location where white whales spend a significant amount of time near glacier fronts, which are areas where ice at the leading edge of a glacier meets ocean water. It is hard to imagine a more fitting place for Beauchemin to begin her own Arctic voyage.

> It's a huge honor for me. I am so excited for what the future holds.

Cadets Awarded Commandant's Letter of Commendation for Research on the Oil Spill Liability Trust Fund

Four cadets majoring in Management were formally recognized by Mr. John Luce, Director of the U.S. Coast Guard National Pollution Funds Center (NPFC), with a Commandant's Letter of Commendation for their innovative capstone research into the long-term viability of the Oil Spill Liability Trust Fund (OSLTF). The OSLTF is a monetary fund administered by the NPFC and used for, among other things, mounting fast and efficient emergency response operations and damage assessments following marine oil spills.

Because marine oil spill events are difficult to forecast, both in frequency and magnitude, questions always exist about whether the OSLTF has the capital necessary to cover response costs for a catastrophic oil spill. In addition, variability over time in spill characteristics and the response costs themselves raises questions about capitalization needed to ensure the fund is sustainable over the long term.

From left to right: 1/c Benjamin Gingrich, 1/c Benjamin Yagey, 1/c Hunter Jennings, Mr. John Luce, and 1/c Cameron Brown.

To understand these risks, 1/c Benjamin Gingrich, 1/c Benjamin Yagey, 1/c Cameron Brown, and 1/c Hunter Jennings undertook a study, *Assessing Comprehensive Risk to the Oil Spill Liability Trust Fund: Stochastic Modeling for Policy Decisions*.

Advised by Dr. Matthew Keblis, the cadets developed a dynamic stochastic model that allows the NPFC to assess the probability that the OSLTF will meet its statutory and regulatory obligations under different taxation and appropriation levels.

The model is exercised using simulation. For any scenario of interest (initial capitalization, tax rates, interest rates, spill event probabilities, and other things) the model is simulated thousands of times, generating as output a probability distribution of fund values. The probability distribution can then be used to determine the likelihood of certain events, like the fund balance dropping below zero.

When presenting the cadets with their awards, Luce highlighted the real-world benefits of their work, recognizing that, for the first time, the model enables the NPFC to provide a risk-based answer to the question of how large the fund should be. In addition, it provides a mechanism for analyzing key policy parameters, such as the interest income generated by investing the OSLTF in Treasury instruments and per barrel tax rates.

Academic Research Competitions

Coast Guard Academy faculty and cadets competed in two nationwide research competitions this year, both hosted by the Department of Defense (DoD). Competitions draw participation from across the U.S. military education enterprise and are open to all Academy cadets. This year, the Academy had six outstanding cadet-faculty teams compete for titles in two competitions.

DoD Academic Research Challenge

The DoD Academic Research Challenge is hosted by the Office of the Secretary of Defense and the Vice Chairman of the Joint Chiefs of Staff. It provides professional military institutions the opportunity to provide "groundbreaking solutions for competition, campaigning, and conflict." Finalists are invited to the Pentagon to brief senior leaders. Competing for the Coast Guard Academy this year were the following teams:

- *Cyber risk management: the Maritime Transportation System (MTS) and decision support tools' considerations*, submitted by 30 cadets in the Spring Cybersecurity Risk Management class. Advisor: Dr. Angela Jackson-Summers
- *A call for clarity: reimagining joint force and Department of Homeland Security roles in undersea cable protection* 1/c Grace Yokitis. Advisor: LCDR Victoria Shreffler
- *Modernizing maritime defense: the case for a U.S. Coast Guard anti-submarine warfare mission set*, 1/c Philip Kirby. Advisor: LCDR Victoria Shreffler

Warfighter Innovation, Science and Engineering (WISE) Challenge

The WISE Challenge is sponsored by the U.S. Army Combat Capabilities Development Command (DEVCOM) Soldier Center. Cadets and midshipmen from the federal service academies present their innovative science and engineering solutions to Service-specific challenges. Entries are judged on innovation, technical approach/analysis, operational impact to the Service, and how well the idea is communicated to a panel of military leaders on the judging panel. Competing for the Coast Guard Academy this year were the following teams:

- *Illegal, Unreported, and Unregulated (IUU) fishing: red snapper*, 1/c Sebastian Sanchez and 1/c Jaime Gustafson. Advisors: Dr. Karina Mrakovcich CAPT Victoria Futch, Dr. Donna Selch, and LCDR Kristen Zelman **Selected for an Impact Award for Outstanding Engagement
- *U.S. Coast Guard Station Cape Disappointment: Autonomous dredge conceptualization*, 1/c Christian Gossage, 1/c Anna Greene, 1/c Adryan Herron, 1/c Luke Manning, 1/c Samual Saftner, and 1/c Brandon Wunder. Advisors: CAPT Brian Maggi and LT Angel Fay
- *Satellite-Based Rescue 21*, 1/c Charles Leventhal, 1/c Ensen Sgaglio, and 1/c Madison Whitworth. Advisor: Dr. Richard Hartnett

CENTER FOR ARCTIC STUDY AND POLICY

Center for Arctic Study and Policy News

The Center for Arctic Study and Policy (CASP) executes research and analysis to support U.S. Coast Guard missions, national policy, and strategic objectives in the Arctic region. Led by Mr. Anthony Russell and Dr. Abbie Tingstad, in partnership with CGA faculty, research highlights from CASP span published papers, conference presentations, and cadet mentoring events.

Research papers

- DeNucci, T., D. Brahan, P. McGonagle, C. Schofield, and D. Taplin-Patterson (2024) A time-dependent ice accretion model for trap-setting fishing vessels with filigree structures. *Proceedings of the 15th International Marine Design Conference*, June 2-6, 2024, Amsterdam, the Netherlands.
- Rivera, A., S.R. Stephenson, and A. Tingstad (2024) Visualizing convergent pressures on arctic development. *Journal of Geovisualization and Spatial Analysis* 8.2 (2024): 36.
- Tingstad, A., K. Vam Abel, M.M. Bennet, I. Winston, L.W. Brigham, S.R. Stephenson, M. Wilcox, and S. Pezard (2024) Divergent rajectories of Arctic change: Implications for future socio-economic patterns. *Ambio* 54.2: 239-255.
- Vlietstra, L.S., and J.E. Thoenen (2024) Poleward shifts in commercial fishing vessel distribution over the Bering Sea shelf, 2013–2022. *Polar Biology* 47(10): 1121-1135.

Commentaries and policy briefs

- Tingstad, A. Icebreakers are niche vessels, but their security, diplomatic value is high. *Seattle Times*, July 28, 2024.
- Tingstad, A., L. Brigham, A. Russell, and W. Muntean. Antarctica is a long way from becoming a contested space, the Coast Guard has a role ensuring it doesn't. CASP Polar Insight, 2024.

Conference presentations

- Russell, A. (2024) Local Arctic (in)security, geopolitical Consequences. Arctic Security conference, Oslo, Norway.
- Russell, A. (2024) Getting in front of Illegal, Unreported, and Unregulated (IUU) fishing in the Arctic: Current and future priorities. Arctic Circle Assembly, Reykjavik, Iceland.
- Tingstad, A. (2024) Arctic security: What, where, and who are we talking about? Arctic Security Conference, Oslo, Norway.

- Tingstad, A. (2024) State of development in the Arctic from 2025 to 2050. Arctic Circle Assembly, Reykjavik, Iceland.
- Tingstad, A. (2024) Transatlantic cooperation in the Arctic: securing a peaceful and prosperous region. Arctic Circle Assembly, Reykjavik, Iceland.
- Tingstad, A. and E. Campbell (2025) Can the Antarctic offer lessons to the Arctic for ocean management? Arctic Frontiers, Tromsø, Norway.

Other events and presentations

- CASP (2025) Re-examining Arctic marine use and associated information needs in a changing environment. Arctic Frontiers Conference side event in collaboration with the Norwegian Polar Institute, January 2025.
- CASP (2025) On thin ice – investigating postures for responding to commercial aircraft emergencies in the Far North. CASP-hosted tabletop exercise, February 2025.

Members of the Center for Arctic Study and Policy at the 2025 Arctic Frontiers Conference. From left to right, 1/c Elise Beauchemin, Mr. Tony Russell, LTjg Samantha Farquhar, LT Daniel Piscoya, and 1/c Emelia Campbell. Credit: Ben Strong

- CASP (2025) Demanding presence in the poles: how a good Arctic strategy is part of our national security. Sea-Air-Space Global Maritime Expo, National Harbor, MD, April 2025.
- Tingstad, A. (2024) State of development in the Arctic: looking from 2025 to 2050. Clark University. Department of Geography, Worcester, MA.
- Tingstad, A. (2025) Arctic natural resources. Presentation to Ted Stevens Center Arctic Regional Security Orientation Course (ARSOC), April 2025.

Cadet and other student projects

- Campbell, E., J. Davidson, and S. Rojas, "Lessons from CCAMLR and other relevant RFMOs for Central Arctic Ocean marine resource management"
- Duclos-Orsello, L., I. Mendoza, S. Ruddins, and E. Warren. "No time for the cold shoulder: how supporting the Antarctic Treaty System promotes U.S. national interests." Policy in Action Program, Brown University, Providence, Rhode Island, May 2025.
- Bentley, G. "Assessing the effectiveness of western sanctions on the Russian Liquified Natural Gas (LNG) industry using geospatial data." U.S. Military Academy (West Point) final class paper, May 2025.
- Program sponsor for Arctic Frontiers Emerging Leaders program, with this year's participants, LT Daniel Piscoya and LTjg Samantha Farquhar.

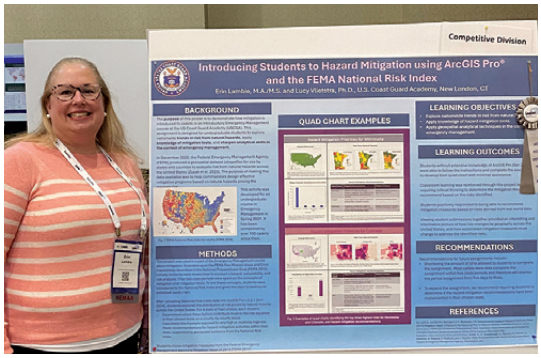
Credit: PA3 Matt Thieme

EMERGENCY MANAGEMENT AND CRISIS LEADERSHIP

Emergency Management and Crisis Leadership News

The Emergency Management and Crisis Leadership (EMCL) Program equips cadets with the knowledge and skills to anticipate, respond to, and lead through crisis. Courses immerse cadets in the real-world challenges posed by emergencies and disasters through projects, lectures, and discussions in addition to visits from guest speakers, field trips, and summer internships.

1/c Sarah Katz (far right) and 1/c Jacey Tippmann (second from right) help to prepare the operations plan during a Preparedness for Response Exercise Program (PREP) exercise in Portsmouth, NH. Credit: Erin Lambie



Ms. Erin Lambie, Emergency Management and Crisis Leadership Program Coordinator, at the International Association of Emergency Managers Conference, Colorado Springs, CO.

This year, the program reached a major milestone: final approval for a new Emergency Management and Crisis Leadership Minor. This is the first minor program offered at the Academy.

To earn the minor, cadets must complete three core courses, starting with Emergency Management. They also take two of the following three courses: Deconstructing Disasters, Emergency Management Professional, or Crisis Leadership. In addition, cadets choose two elective courses from a list of several that incorporate emergency management principles in the context of other disciplines. Examples include Structural Design for Extreme Events, Homeland Security Policy, and Fate and Transport of Chemicals in the Environment.

Guest speakers are also an essential element of the EMCL program, bringing real-world insights and career advice to the cadets. They include experts from the U.S. Coast Guard's emergency management community, civilian professionals, as well as Academy faculty and staff with decades of combined experience in emergency management and disaster response.

This year, cadets engaged with guests, CAPT Jamie Frederick, USCG Sector Boston; CAPT Eva Van Camp and CAPT Anna Hickey, USCGA; CAPT Amy Florentino, USCG (Ret); LCDR Dan Dunn, USCG Emergency Management and Disaster Response; Dr. Abbie Tingstad, USCGA Center for Arctic Study and Policy; LT Jonathan Roth, USCG Sector Long Island Sound; Mr. Peter Gaynor, USMC (LTC, Ret); and LT Sarah Dupre and LTJG Max Carfagno, USCG Atlantic Strike Team.

In addition, Ms. Erin Lambie, EMCLP Program Coordinator, presented a poster at this year's International Association of Emergency Managers (IAEM) conference in Colorado Springs, CO. It highlighted a hands-on, data-based project assigned to students in *Emergency Management*. Completed in ArcGIS Pro®, the project helps cadets understand the concept of hazard mitigation by guiding them through an analysis of spatial data from the publicly available FEMA National Risk Index.

Over 100 students completed the project this year alone, and the poster was awarded a Silver Certificate of Recognition at the conference.

FACULTY PUBLICATIONS AND AWARDS

2024 Faculty Publications

Peer-Reviewed Articles and Conference Proceedings

Aleksunes, L.M., J.P. Gray, J. Meshanni, J.D. Laskin, and D.L. Laskin (2024) Repurposing FDA-approved drugs to treat chemical weapon toxicities: interactive case studies for trainees. Pharmacology Research & Perspectives 12:e1229.

Bergondo, D., B. Berman, J. Rodriguez, D. Loomis, and T. Polon (2024) Endangered species and response actions dashboard. *International Oil Spill Conference Proceedings* (1): 2024122.

Denton, G. and H.B. Sanborn (2024) Who can you blame? Trust in institutions and mobilization across regimes in Asia. *Asian Journal of Comparative Politics* 9(2): 324-339.

Diamond, E., N. Damato, T. Smythe, and D. Bidwell (2024) Legitimacy through representation?: Media sources and discourse of offshore wind development. *Frontiers in Communication* 9: 1401172.

Diamond, E., N. Damato, D. Bidwell, and T. Smythe (2024) Framing the wind: media coverage of offshore wind in the northeastern United States. *Environmental Communication* 19(2): 161-178.

East, A., C.G. Polasek, E.A. Miller, S. Ranganathan, I.D. Reda, A. Patel, C.D. Ahlers, S.K. Zingales, C.E. Karver (2024) Expansion of the structure-activity relationship profile of triaminopyrimidines as inhibitors of caspase-1. *Chemical Biology & Drug Design*, 109:e70031.

Emami, T. (2024) Project-based learning on diverse concepts in a power electronic laboratory. *Proceedings of the 2024 American Society for Engineering Education (ASEE) Annual Conference and Exhibition*, Portland Oregon, June 23-26, 2024.

Fleischmann, C., H. Jackson, K. Tarhini, and B. Maggi. (2024) Pedagogical changes to a capstone course to foster refinement of professional skills. *American Society for Engineering Education (ASEE) Annua Conference and Exhibition*, Portland, Oregon, June 23-26, 2024.

Gonzalez, J.B. (2024) A skillet poem. Here. 2024 Issue. Reprinted in 2024 Pushcart Prize XLVIII Best of Small Presses. Edited by Bill Henderson with the Pushcart Prize Editors. Pushcart Press 2024th Edition.

Hall, G.J., E.J. Page, M. Rhee, C. Hay, A. Krause, E. Langenbacher, A. Ruth, A.P. Duran, I. Kamara, J.K. Iskander, F. Alsayyid, D.L. Thomas, N. Porta, B.A. Osterink, S. Zelmanowitz, C.M. Fleischmann, D. Liyanage, and J.P. Gray (2024) Wastewater surveillance of U.S. Coast Guard installations and seagoing military vessels to mitigate the risk of COVID-19 outbreaks, March 2021-August 2022. *Public Health Reports* 139(6): 699-707.

Imbriale, P., E. Stavrulaki, and J. Livingston (2024). Can media reports encourage donors to give cash instead of in-kind? Evidence from an experiment. *Journal of Behavioral and Experimental Economics* 110: 102206.

Jackson-Summers, A.G. (2024). A qualitative multi-method study of U.S. Banks' financial reporting addressing Security Risk Management (SRM) operational effectiveness and SRM maturity. *Journal of Management Policy and Practice* 25 (2): 69-83.

Jackson-Summers, A.G., K.L. Mrakovcich, J.P. Gray, C.M. Fleischmann, T. Emami, and E.J. Page (2024) A systematic review of inclusive pedagogical research using the CIRTL inclusive pedagogy framework: multidisciplinary and STEM perspectives, current trends and a research agenda. Discover Education 3(30): 1-25.

Jackson-Summers, A. (2024) Inclusive communication toward a sense of belonging using pictorial representation and interpretive analysis for improved Management Information Systems course delivery. *iCERi2024 Proceedings*, pp. 753-758, Seville, (Spain), November 11-13, 2024.

Kudlak, Z.A. and J.B. White (2024) The effect of the COVID disruption in 2020 on high school learning and college preparation: one college's experience" *Business Education Innovation Journal* 16(2): 13-19.

McGarry, D., R.J. Hartnett, P. Swaszek, M. DeCoste, A. Ferderer, C. Leventhal, and R. Mitchell (2024) Locating simultaneous VHF distress calls using a single LEO satellite – an idea for augmenting Rescue 21 in Alaska *Proceedings of the 37th International Technical Meeting of the Satellite Division of The Institute of Navigation* (ION GNSS +2024), pp. 539-559, Baltimore, MD, September 2024.

McGrath, G. and D. Bergondo (2024) Expanding numerical modeling across the United States to test Geographic Response Strategies. *International Oil Spill Conference Proceedings* 2024 (1): 306s1.

Meyers, J., T. Sayre-Mccord, Z. Zhang, and H. Singh (2024) Toward a COLREGs compliant autonomous surface vessel in a constrained channel. *IEEE Transactions on Field Robotics* 1:537-547.

Credit: PA3 Matt Thieme

Mrakovcich, K. and C. LaCasse (2024) Prompting engagement: scaffolded writing designed to enhance student learning in fisheries biology. *Journal of College Science Teaching* 54(2): 119-127.

Persun, M., D. Bergondo, and T. Polon (2024) Multi-dimensional quantitative analysis for Geographic Response Strategy validation.*International Oil Spill Conference Proceedings* 2024 (1):309s2.

Pournader, M., A. Narayanan, M.F. Keblis, and D. Ivanov (2024) Decision bias and bullwhip effect in multiechelon supply chains: risk preference models. *IEEE Transactions on Engineering Management* (71): 9229-9243.

Rigby, F.E., L.P. Ciamarra, M. Holmberg, N. Madhusudhan, S. Constantinou, L. K. Schaefer, J. Deng, K. K. M. Lee, and J. I. Moses (2024) Towards a self-consistent evaluation of gas dwarf scenarios for temperate sub-Neptunes. *Astrophysical Journal* 975(1): 101.

Rivera, A., S.R. Stephenson, and A. Tingstad (2024) Visualizing convergent pressures on arctic development. Journal of *Geovisualization and Spatial Analysis* 8:36.

Rivero, E. (2024) Más allá de los límites: Memorias, silencios y afectos en *Secretos de lucha* (2007)" *Tropelías: Revista de teoría de la literatura y literatura comparada* (10): 159-178.

Ryan, K., E. Tobey, D. Burke, T. Larkin, T. Taylor, A. Lawrance, and B. Thomas (2024) Lift boat stability using energy-to-incline and varying inclination direction. *Journal of Ship Production and Design* 12(11):27-34.

Schroeder, J., K.M. Polemi, A. Tapaswi, L.K. Svoboda, J.Z. Sexton, and J.A. Colacino (2024) Investigating phenotypic plasticity due to toxicants with exposure disparities in primary human breast cells in vitro. *Frontiers in Oncology* 14:1411295.

Smythe, T. (2024) Conflict or coordination? An analysis of the Southern New England offshore wind - fisheries policy network. *Marine Policy* 163:106106.

Smythe, T., L. Cass, and D. Bidwell (2024) Conflict or coexistence? An analysis of multi-use of marine waters in Rhode Island, USA. *Marine Policy* 173: 106545.

Tingstad, A., K. VanAbel, M.M. Bennett, I. Winston, L.Q. Brigham, S.R. Stephenson, M. Wilcox, and S. Pezard (2024) Divergent trajectories of Arctic change: implications for future socio-economic patterns. *Ambio* 54.2 (2025): 239-255. [First published online in 2024]

Vlietstra L.S., and J.E. Thoenen (2024) Poleward shifts in commercial fishing vessels over the Bering Sea Shelf, 2013-2022. *Polar Biology* 47(1):1121-1135.

Wackerly, J.W., M.T. Wentzel, and S.K. Zingales (2024) Teaching abductive reasoning for use as a problem-solving tool in organic chemistry and beyond. *Frontiers in Education* 9:1412417.

Books and Book Chapters

Beer, F.P., E.R. Johnston, and D.F. Mazurek (2024) *Vector Mechanics for Engineers: Statics*. McGraw-Hill, New York, NY, 614 pages.

Gray, J.P., S. Rotering, Z. Smith, M. Danai, D. Genis, S. Mahmood, and S. D. Ray (2024) Recent clinical studies on metals and meta antagonists. In: Ray, S.D. (Ed.), *Side Effects of Drugs Annual, 46th edition*. Elsevier Inc.

Mazurek, D. (2024) Engineering Landmark, *The Monticello*, Chapter 6, Ontario & Western Railway Historical Society, Middletown, NY, 16 pages.

Ray, S.D., M. S. D'Souza, and J. P. Gray (2024) Analysis of ADRs, ADEs, drug interactions, toxicity and side effects of drugs in the shadow of vaccines, drug-antibody conjugates and pharmacogenomics. In: Ray, S.D. (Ed.), *Side Effects of Drugs Annual, 45th edition*. Elsevier Inc.

Rivero, E. (2024) *Úselo y tírelo* (Eduardo Galeano). In *Ibero-American Ecocriticism*. J. Manuel Gómez, editor. Maryland: Lexington Books.

Faculty Awards

2024 Summer Research Fellowship Awardees

- Dr. Arundhati Bagchi Misra. “Image denoising using deep learning techniques”
- LCDR Peter Imbriale. “U.S. Coast Guard retention: extended analysis of data gathered via a 3-year Management + ORDA capstone project” and “Post-disaster material convergence: shifting from in-kind donations”
- Dr. Elise Jones. “Role of agency in inter-identity work” and “U.S. Coast Guard retention”
- LT Patrick W. Ledzian. “Decentralized synchronization of underwater buoyancy gliders”
- Dr. Kanani K.M. Lee. “Salty ices at high pressures”

2024 Faculty Research Forum Lunchtime Seminar Series

The lunchtime seminar series fosters inter-departmental communication and awareness of scholarly activities across campus. This year’s seminars include the following:

- January 29, 2024: Dr. Michael C. Bellissimo, “Reliability and resilience at U.S. hospitals during the global pandemic: a mixed methods study on the effects of leader and team behavior on crisis response”
- March 20, 2024: CAPT Corinna Fleischmann, Dr. Hudson Jackson, and CAPT Brian Maggi. “Enriching student learning through active participation in a coastal resiliency course”
- April 17, 2024: Dr. Yang Xu, "Using Artificial Intelligence (AI) in teaching"
- September 18, 2024: Dr. Wes Huffman, “Hg in the Bering Sea”
- October 10, 2024: Dr. David Burn and Dr. Stanley Rothman, "A statistical ranking of the top ten professional sports teams of all time"
- October 30, 2024: Dr. Elise Jones and LCDR Peter Imbriale, "Factors motivating Coast Guard members' continued service and their relationship with length of service"
- December 4, 2024: Dr. Kanani K. M. Lee, “Importance of impurities in melting at high pressures: a case study of molybdenum”

CADET CAPSTONE PROJECTS

2024-25 Cadet Capstone Projects

School of Engineering and Cyber Systems

1/c Abate, 1/c Church, 1/c McGill, and 1/c Nusraty. Roboboat. Advisor: LT Patrick Ledzian

1/c Akers, 1/c Renaud, and 1/c Dreier. Human propulsion unit for Race to Alaska watercraft. Advisor: LCDR Matthew Stroebel

1/c Allentuck, 1/c Gaviola, 1/c Hartung, and 1/c Prince. Intelligent hybrid power plant. Advisors: Dr. Tooran Emami, LCDR Dan Burke, and LCDR James Meyers

1/c Andersen, 1/c Johnson, 1/c Souvignier, and 1/c Tate. SAR via reinforcement learning. Advisors: LT Patrick Ledzian

1/c Andrus and 1/c George. SeaLion CubeSat deployable composite (DeCo) payload. Advisors: Mr. Daniel Burbank and Dr. Richard Freeman

1/c Ashby, 1/c Beck, 1/c Noble, 1/c Pond, 1/c Schaufelberger. TRACEN Petaluma – AST Schoolhouse design. Advisors: Dr. Kassim Tarhini and LT Wyatt Keiffer

1/c Ashley, 1/c Christopher, 1/c Konieczny, 1/c Northcutt. Station of the future. Advisors: CAPT Brian Maggi and LT Alyssa Milanese

1/c Baggett, 1/c Gruen, 1/c Marcy, 1/c McCaskey, and 1/c Marra. Juneau Alaska – Child Development Center design. Advisors: Dr. Kassim Tarhini and LT Alyssa Milanese

1/c Barrett, 1/c Harris, and 1/c Niles. Hydra bilge pump. Advisor: Dr. Andrew Foley

1/c Bayesa, 1/c Randall, 1/c Smutny, and 1/c Throne. TRACEN Cape May – Recapitalize firehouse. Advisors: LT Wyatt Keiffer and Dr. David Mazurek

1/c Bland, 1/c Boe, 1/c Hernandez Kossick, and 1/c Kearney. A quantum secure cryptographic implementation. Advisor: LT William Maxam

1/c Brandon and 1/c Westervelt. Resilient engineering: additive manufacturing impeller pump relative performance investigation. Advisor: Dr. Ronald Adrezin

1/c Carreon, 1/c Bottke, 1/c Liang, and 1/c O'Sullivan. STA Apra Harbor – Redevelopment of STA Apra Harbor. Advisors: Dr. David Mazurek and Dr. Hudson Jackson

1/c Cascio, 1/c Iyer, 1/c Robey, and 1/c Sun. Visualization of company financials. Advisor: LCDR Dahnyoung McGarry

1/c Duthu, 1/c Garcia, 1/c Gilbert, and 1/c West. MITRE eCTF. Advisor: Dr. Mohamed Elwakil

1/c Edwards, 1/c Lista, 1/c Manley ,1/c Porter, and 1/c Scharnitzky. Base Honolulu – optimal mooring solution for the Pier 53 parcel acquisition. Advisors: Dr. Hudson Jackson and LT Angel Fay

1/c Fulbright. Evasion and breeching of modern endpoint detection and response solutions. Advisor: LT Richard Williams

1/c Gillis, 1/c Penella, and 1/c Simon. Maritime port infrastructure cybersecurity port infrastructure. Advisor: Mr. Stephen Choi

1/c Gossage, 1/c Green, 1/c Herron, 1/c Manning, 1/c Saftner 1/c Wunder. STA Cape Disappointment – Waterfront sediment transport intervention design & autonomous dredge conceptualization. Advisors: CAPT Brian Maggi and LT Angel Fay

1/c Hernandez Andrade, 1/c Dykens, and 1/c Vicinanzo. SeaLion CubeSat burn-wire deployment mechanism. Advisors: Mr. Daniel Burbank, Dr. Richard Freeman

1/c Herron, 1/c Carney, 1/c Mercatoris, and 1/c Langenbacher. STA New York: Stormwater System Design. Advisors: Dr. Dounia Elkhatib and CAPT Corinna Fleischmann

1/c Joseph, 1/c Nazar, 1/c Park, and 1/c Ian Roeder. Homeport - Cadet accountability app. Advisor: Mr. Ethan Gold

1/c Lahoz Santana, A., 1/c Salan, 1/c Bolton, and 1/c Bucki. USCG Antarctic ice breaker design. Advisors: Dr. Thomas DeNucci and CDR Michael Daeffler

1/c Leventhal. Scholars Project: GPS multipath error in shipboard UAV retrieval. Advisor: Dr. Richard Hartnett

1/c Leventhal, 1/c Sgaglio, and 1/c Whitworth. Satellite Rescue 21. Advisor: Dr. Richard Hartnett

1/c Marquez de la Plata, 1/c Mason, and 1/c Thorburn. RF energy harvesting. Advisors: Dr. Paul Crilly

1/c O'Melveny, 1/c Jozwik, 1/c Coats, and 1/c Lewis. Commercial oceangoing roll on-roll off ferry design. Advisor: LCDR Ian Oviatt

1/c Strand, 1/c Messner, and 1/c Drew. SeaLion CubeSat mission and spacecraft design. Advisor: Mr. Daniel Burbank

1/c Weiland, 1/c Nunn, and 1/c Brewer. Engineering Department recirculation tank test bed. Advisor: LCDR Matthew Stroebel

School of Leadership and Management

1/c Aime, 1/c Flynn, 1/c Pettyjohn, and 1/c Soletti. How commercial fishery regulations impact local economies: a comparative analysis with an eye towards the opening of the Central Arctic Ocean for commercial fishing. Advisors: CAPT Corinna Fleischmann and CDR Jeff Janaro

1/c Armentrout, 1/c Blethen, 1/c Hunter, and 1/c Mintchwarner. USCGA cadet division structure and collaterals. Advisors: LCDR Peter Driscoll-Kwan and LCDR Chris Shih

1/c Beardsley, 1/c Gorman, 1/c Houston, and 1/c Jacobson. Tall Ships America: feedback guide and techniques. Advisor: LCDR Ed Gailor

1/c Berrios, 1/c Mintz, 1/c Nemsick, and 1/c Tabit. Opening eyes at Drydock and Leamy Café. Advisor: LCDR Nicholas Martin

1/c Bragg, 1/c Jones, 1/c Lasher, and 1/c Patz. EZSupply Standard Operating Procedures: a guide for U.S. Coast Guard financial managers. Advisor: Dr. Matthew Keblis

1/c Cook, 1/c Berger, and 1/c Griffin. Measure of financial literacy in the United States Coast Guard Officer Corps and the Corps of Cadets for year groups 2020-2028. Advisor: Dr. Joseph Brown

1/c Countryman, 1/c Madden, 1/c O'Brien, and 1/c Song. The future of Arctic search and rescue: are we ready? Advisors: CAPT Corinna Fleischmann and CDR Jeff Janaro

1/c Garcia, 1/c Grant, and 1/c Rott. USCG disaster preparedness through community outreach. Advisor: Dr. Mike Bellissimo

1/c Gingrich 1/c Yagey, 1/c Brown, and 1/c Jennings. Assessing comprehensive risk to the Oil Spill Liability Trust Fund: stochastic modeling for policy decisions. Advisor: Dr. Matthew Keblis

1/c Jackson, 1/c Jones, and 1/c Mann. USCGA recruitment through secondary school mentoring. Advisor: Dr. Mike Bellissimo

1/c Reynolds, 1/c Rooney, and 1/c Thomas. Base Boston EZSupply inventory management. Advisor: LCDR Peter Imbriale

School of Science, Mathematics, and the Humanities

1/c Aime and 1/c Griswold. Territorial disputes in Asia: the impact of economics and identity on violent conflict. Advisors: Dr. Ginger Denton and Dr. Aki Nakai

1/c Beauchemin, 1/c DeGennaro, 1/c Greene, and 1/c Hammond. Multinational vessel activity in the Bering Sea and U.S. Arctic Ocean. Advisor: Dr. Lucy Vlietstra

1/c Bediamol, 1/c Weston, 1/c Coutu, and 1/c Yi. Alaskan region usage study. Advisors: Dr. Katherine Krystinik and Dr. Eric Peterson

1/c Brown, 2/c Taylor, 2/c Kettish, and 2/c Lolley. Model United Nations (UN). Advisors: CDR Erin Christensen and Dr. Aki Nakai

1/c Clifford, 1/c Felkins, 1/c Hammon, and 1/c Lopez. Workforce specialty simulation. Advisors: LCDR Justin Maio and LT Christine Olds

1/c Deery, 1/c Hare, and 1/c Moore. Leeway and renewable energy. Advisors: CAPT Victoria Futch and LCDR Andrew Nielsen

1/c Dressback, 1/c France, and 1/c Prosperi. China's expanding port influence in Latin America: implications for U.S. counter-narcotics and maritime security. Advisors: LCDR Jon Tschudy and Dr. Liz Stein

1/c Edghill, 1/c King, 1/c Brown, 1/c Sanchez, and 1/c Kirby. Fishing for answers: identifying best practices to combat IUUF in the Gulf of Guinea. Advisors: Dr. Evan Haglund and LCDR Ned Burgwyn

1/c Hardy and 1/c Folkes. CubeSat SeaLion mission: final steps for a Summer 2025 launch. Advisors: CAPT Royce James and Dr. Lorraine Allen

2/c Hardy, 2/c Penella, and 2/c Van Cise. CGC Molten. Advisors: Dr. Jillian McLeod and LCDR Justin Sherman

1/c Harrington, 1/c McCarthy, 1/c Sargent, and 1/c Enestvedt. Fusion of AIS and Computer Vision data for Maritime Domain Awareness. Advisors: Dr. Ian Frommer and CDR Steven Blum

1/c Hickman, 1/c Lee, 1/c Trager, 1/c Uwamahoro. Vessel traffic analysis for maritime fairway designation. Advisors: LCDR Justin Sherman and LCDR Douglas Neumann

1/c Hodges, 1/c Katz, 1/c Lyman, and 1/c Middleton. Effects of microplastics on C. elegans lifespan and sensitivity to toxicants. Advisors: Dr. Joshua Gray and LT Jade Schroeder

1/c Howard, 1/c Hillón, and 1/c White. Changes of properties of dielectric fluids after simulated sunlight exposure. Advisors: CAPT Gregory Hall and Dr. Glenn Frysinger

1/c Irwin and 1/c Reeser. Analyzing the Norwegian Pension Fund (Global): an organization-focused approach. Advisor: Dr. Edward Canuel

1/c Keogh. Salinity impacts in ice formation at room temperature. Advisor: Dr. Kanani K.M. Lee

2/c Lempriere, 2/c McGowen, 2/c Miller, and 2/c White. Buoy Location & Identification Platform (BLIP). Advisors: Dr. Jillian McLeod and LCDR Justin Sherman

1/c Lingle, 1/c Littlejohn, 1/c MacGregor, and 1/c Shaw. Chemical analysis of microplastics in the Thames River, CT, and survey of coastal marine debris on beaches in New London, CT. Advisors: Dr. Karina Mrakovcich, Dr. Deanna Bergondo, and LCDR Matthew Brigham

1/c McCartin, 1/c Monahan, 1/c Pokress, and 1/c Yi. Determining CG civilian employee stressed job series. Advisors: Dr. Eric Johnson and Dr. David Burn

1/c Mergott. From competition to cooperation: in the pursuit of rectifying compassion and authentic community. Advisor: LCDR Jonathan Lang

1/c Morrissey. Atmospheric monitoring. Advisors: Dr. Brooke Stutzman and Mr. David Williams (EPA)

1/c Mullen, 1/c Schur, and 1/c Irugalbandara. Metal contaminants in Bluff Point salt marsh cores. Advisor: Dr. Glenn Frysinger

ENS Nogami and ENS Okubo. Japan Coast Guard Academy: a look inside our partner service academy in Japan. Advisor: LCDR Andrew Fox

1/c Rojas, 1/c Campbell, and 1/c Davidson. Lessons from the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and other relevant Regional Fishery Management Organizations (RFMOs) for Central Arctic Ocean (CAO) marine resource management. Advisors: Mr. Tony Russell and Dr. Abbie Tingstad

1/c Ruggieri, 1/c O' Shea, and 1/c Phillips. A cadet's experience embedded in various CT state agencies (internship). Advisor: LCDR J. Matthew Hurtt

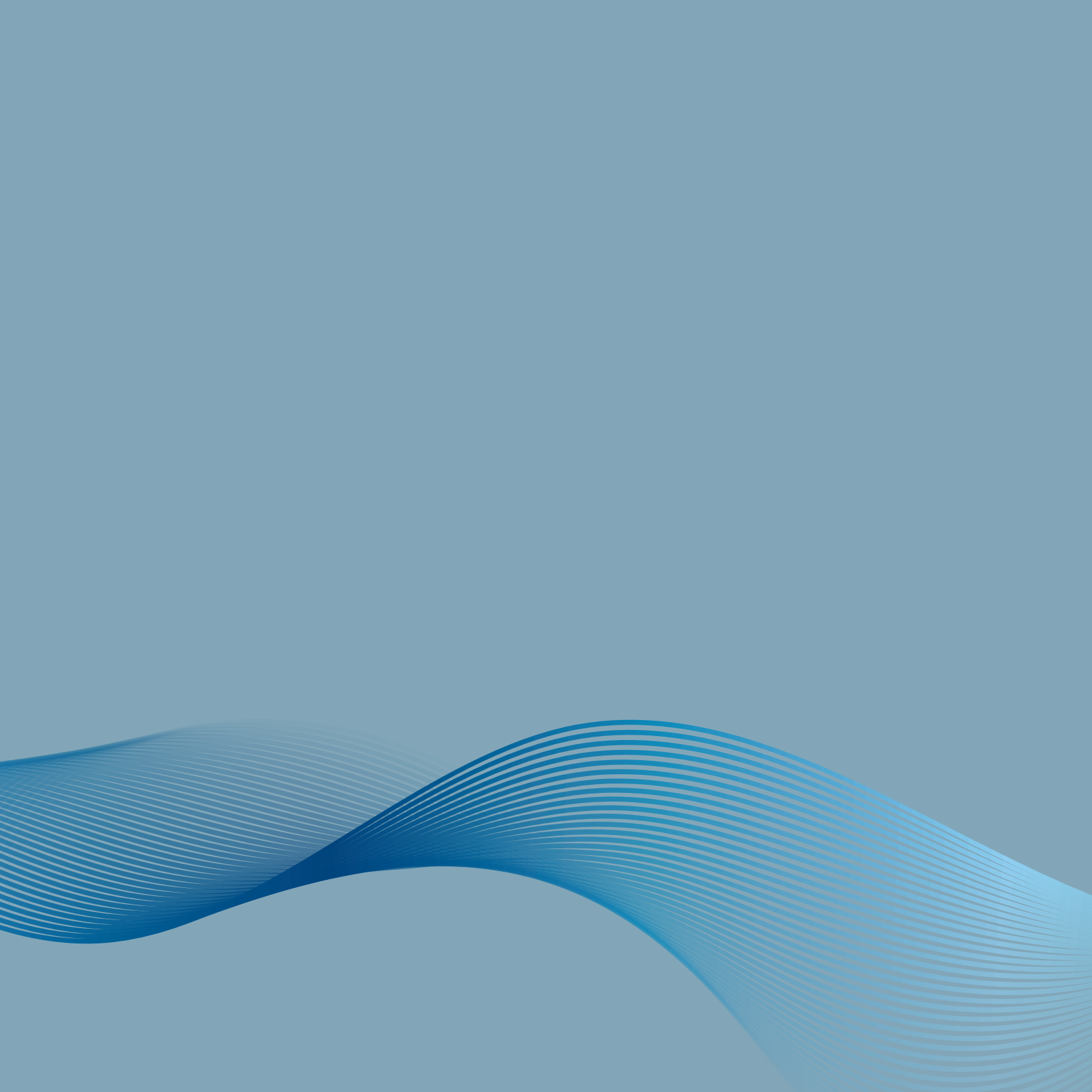
1/c Ruggieri, 1/c Weber, 1/c Davidson, and 1/c Jerkatis. Law of Armed Conflict Service Academy Competition at the International Institute of Humanitarian Law in Sanremo, Italy. Advisor: LCDR J. Matthew Hurtt

1/c Sanchez and 1/c Gustafson. Illegal fishing of red snapper (Lutjanus campechanus) near the Texas-Mexico maritime border. Advisors: Dr. Karina Mrakovcich, CAPT Victoria Futch, Dr. Donna Selch, and LCDR Kristen Zelman

1/c Seazzu. Living shoreline suitability model. Advisors: Dr. Donna Selch and CAPT Victoria Futch

1/c Tippman. Transport and fate of non-conventional oil spills in Great Lakes. Advisors: Dr. Deanna Bergondo and Ms. Erin Lambie

1/c Yokitis. The role of the Global Maritime Operational Threat Response Coordination Center in the Arctic. Advisor: Dr. Evan Haglund

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