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# Midshipman Research Poster Session



**U.S. Naval Academy  
Nimitz Library  
13 Dec 2022**

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|-----------|---|
| 0830-0900 | Open poster viewing<br>Mids are free to view other posters and talk to classmates about research.<br>Guests can view posters. |
| 0900-1030 | All mids must stand by their posters and discuss their research with faculty and guests.                                      |

These midshipmen are enrolled in independent research courses (XX495 or Trident) or honors courses, and have been working with USNA faculty on projects in many areas, including those of interest to the Navy. This unique learning experience allows midshipmen to apply their classroom knowledge to new areas and important problems as well as develop their critical thinking skills. Today, we celebrate their accomplishments and contributions.

<b>POSTER #</b>	<b>MIDN Presenter(s)</b>	<b>Department</b>	<b>Poster Title</b>	<b>Adviser(s)</b>
1	Charlotte Ryan <sup>B</sup>	Mechanical Engineering	The Design and Load Testing of 3D Printed Gridshell Structures	S. Malek
2	David Huizenga <sup>B</sup>	Mechanical Engineering	Strip Blister Modeling and Investigation	J. Schubbe
3	Lian Dunlevy <sup>T</sup>	Mechanical Engineering	Towards an All-Fiber Frequency Domain Thermoreflectance System	A. Smith, B. Donovan, B. Jenkins
4	Ryan Conway <sup>T</sup>	Mechanical Engineering	Determination of Energy Absorption Characteristics of a Cylindrical Wave Energy Converter in Linear Waves	L. Luznik, L. DeVries
5	Erik Pryal <sup>B</sup>	Mechanical Engineering	Technical Evaluation of Alcohol-to-Jet Diesel Fuels	J. Cowart
6	Natalie Graham <sup>B</sup>	Mechanical Engineering	Understanding 3D Printing Process Parameters for Metals using Scanning Electron Microscopy	B. Earp, E. Getto
7	Cole Roske	Mechanical Engineering	Heat Transfer of Triply Periodic Additively Manufactured Polymer Cold Plates	J. Cowart
8	Wyatt Smith	Mechanical Engineering	Comparison of Point Temperature and Scintillometer Optical Turbulence Measurement Methods with Applications to Directed Energy Systems	C. Brownell, J. Burkhardt, C. Nelson
9	Charlotte d'Halluin	Mechanical Engineering	Structural Analysis of Arches as Gridshell Components	S. Malek
10	Izabella Peralta	Mechanical Engineering	Structure Analysis of Passive Filtration Plate Based Off Manta Ray Filter Feeding	S. Malek
11	Vaughn Schmitz	Mechanical Engineering	Structural Similitude of Gridshell Small-Scale Models	S. Malek
12	Stephen Stokes <sup>B</sup>	Mechanical Engineering	Hot Gas Corrosion in a Single Nickel Alloy	E. Getto
13	Will Anderson	Mechanical Engineering	Thermal Aging of T6-Aluminum 6061 Using a High Energy Laser	P. Joyce, C. Brownell
14	Gianluca Freschi <sup>B</sup>	Mechanical Engineering	Corrosion Testing and Analysis of Multi-Walled Carbon Nanotube (MWCNT) Doped MIL-DTL 24441 Epoxy Coating	B. Earp, M. Koul
15	Hitoshi Cullinan	Mechanical Engineering	Analysis of Proliferation Resistance of Nuclear Fuels for Microreactors	S. Blair
16	Sean Doherty	Mechanical Engineering	Comparison of Cn2 Measurement Tools for Determining Atmospheric Turbulence	C. Brownell
17	Sid Hall-Smith <sup>B</sup>	Mechanical Engineering	$\gamma$ -Irradiation of Nylon-12 Manufactured via Injection Molded and Selective Laser Sintering	E. Getto, P. Joyce
18	Taiyo Tataru	Physics	Reducing Lightcurves to Determine Planetary Defense Capabilities	M. Knight
19	Steven Florence	Physics	Refinement of the Time Delay in the Doubly-Imaged Lensed Quasar SDSS J1650+4251	C. Morgan
20	James Margeson	Physics	Eliminating Contamination Flux from a Star in the Vicinity of SBS J1520+530	C. Morgan, J. Larsen

POSTER #	MIDN Presenter(s)	Department	Poster Title	Adviser(s)
21	Derek Gess <sup>T</sup>	Physics	Nanostructured Surface-Based Electro-Optic Liquid Crystal Devices	R. Basu
22	Kara Kniezewski	Physics	A Study of Flare Severity and Active Region Magnetic Complexity on Post-Flare Loop Length	E. Mason, C. Morgan
23	Robert Hare <sup>T</sup>	Physics	Quantum Engineering in the Undergraduate Laboratory: Entanglement and Violations of Local Realism	S. Rittenhouse, J. Helton, M. Manicchia
24	Vanessa Ortiz <sup>B</sup>	Physics	Electromagnetically Induced Transparency in a Ladder System	S. Rittenhouse
25	Jordan Barnhart	Physics	Fluidic Artificial Muscles Tested in Series	E. Chapman
26	Zain ElJdaitawi	Physics	Multiview Skeletal Tracking for Athletic Performance Assessment	E. Chapman
27	Dara Hulstein	Physics	The Study of Artificial Muscles Behavior in a Vacuumized Environment	E. Chapman
28	Natalie Graham <sup>B</sup>	Physics	Oxide Microstructure Control Using Laser Heating	B. Donovan
29	Kelly Hughes, Millie Oldham	Chemistry	Characterizing Prion Peptide Aggregation and Surface Interactions by means of Atomic Force Microscopy	E. Yates
30	Will Ashe <sup>T</sup>	Chemistry	Enhancement of Metal Organic Frameworks for Degradation of Nerve Agents	C. Whitaker
31	Rachel Sanborn <sup>T</sup>	Chemistry	Combating Antibiotic Resistance: Evaluation of Novel Atypical $\beta$ -lactams Against Mycobacterial Ldt Enzymes	L. Basta
32	Waehung Ng	Chemistry	Analysis of Antibacterial and Enzyme Inhibitory Properties in <i>Ginkgo biloba</i> Leaves	V. Smith
33	Megan Lydon	Chemistry	Spectroscopic Analysis of Conformational Changes of Aconitase	V. Smith
34	Justice Mermerian	Chemistry	Activation Energy of Oxygen Desorption from Mixed Ice Surfaces by Vibrational Spectroscopy	R. Ferrante
35	Daniel Fohner <sup>B</sup> , Jack Neubauer	Chemistry	Effects of Fuels and Organic Compounds on the Swelling Properties of O-Rings Produced by Additive Manufacturing	D. Luning Prak, J. Cowart, B. Baker
36	Kaitlin Nachtrieb <sup>B</sup>	Chemistry	Evaluating Polycyclobutanes as Energetic Binders for Propellant Applications	M. Mohadjer Beromi
37	Colby MaGill, Ian Dinmore	Chemistry	Accessing Active Mycobacterial MurA Toward Generating Putative L,D-Transpeptidase Substrates	L. Basta
38	Dina Giles	Chemistry	Production and Characterization of Multifunctional Polyhydroxyalkanoate Polymers	A. Pinto
39	Abram Dierickx	Chemistry	Electrochemical and Spectroscopic Study of L-Glutathione with Bismuth Compounds	G. Cheek

<b>POSTER #</b>	<b>MIDN Presenter(s)</b>	<b>Department</b>	<b>Poster Title</b>	<b>Adviser(s)</b>
40	Michaela Stangel	Chemistry	The Development of Csp <sup>2</sup> -Csp <sup>2</sup> Cross-Nucleophile Coupling Through Nickel-Catalyzed Oxidative Coupling of Grignard Reagents	M. Mohadjer Beromi
41	Austin Cusumano, Andrew Nixon	Chemistry	Characterization of Human Endogenous Retrovirus-K Rec Protein	I. O'Carroll
42	Jackson Fuller, Chloe Skogg	Chemistry	Development of Commercial Proteins as Barnacle-Inspired Underwater Adhesives	E. Yates
43	Zayda Fredericks	Chemistry	An Investigation of the Initial and Continued use of Evidence-Based Practices in Chemistry Instruction: A Case Study on Clicker Use	M. Teichert, M. Schroeder, D. Luning Prak
44	Daniel Chang, Hannah Klein	Chemistry	Using the Chemistry of Bread-Making to Engage Students in the Laboratory	M. Schroeder
45	Matthew Thibodaux	Chemistry	Investigation of Analytical Methods for Measuring Fermentable Sugars in Beer Fermentation	R. Siefert
46	Lee Fromm, Alejandro Rentas Barrios	Chemistry	Destruction of Organophosphorus Nerve Agents Using Metal-Organic Frameworks (MOFs)	C. Whitaker
47	Janette Fernandez	Chemistry	Understanding Interactions/Effects of Intracytoplasmic Membranes Compositions in Methanotrophs and Methane Consumption	M. Konopka
48	Anders Gulbrandson <sup>T,B</sup>	Chemistry	Mesoporous Cellulose Scaffoldings	D. Durkin, P. Trulove
49	Peyton Johnson	Chemistry	Optimization of the Solvent Exchange Process in the Ionic Liquid Based Generation of Mesoporous Cellulosic Materials	D. Durkin, P. Trulove
50	Lucas Padilla	Chemistry	Characterizing Potential Organometallic Oxygen Sensors	J. Goldenberg, M. Burnett
51	Elizabeth Sullivan	Chemistry	Using Photoiniferter Chemistry to Synthesize Cyclic Polymers from Vinyl Monomers	J. Ham
52	Ian Pytlik	Chemistry	Evaluation of Anti-Corrosion Coatings Using Scanning Electrochemical Microscopy	J. Spencer
53	Edward Gravois	Chemistry	RAFT Polymer Synthesis HTPB	W. Farrell
54	Jasmine Forbes	Chemistry	Electrostatics Study of Proteins with Surface Ion Substitutions	J. Schlessman
55	Jonathan Schroeder	Electrical Engineering	A Dynamically Allocating Non-terrestrial Mobile Nomadic Network	C. Anderson, S. Koss
56	Andrew Faber	Electrical Engineering	Aerosol Jet® Printing RF Components on Flexible Substrates for Wearable Applications	H. ElBidweihy, C. Smith
57	Guillermo Pass-Robles <sup>B</sup>	Electrical Engineering	Gallium Nitride Schottky Contacts with Rhenium and Palladium/Laser Strike Detection on Pyrolytic Graphite	C. Martino

<b>POSTER #</b>	<b>MIDN Presenter(s)</b>	<b>Department</b>	<b>Poster Title</b>	<b>Adviser(s)</b>
58	Ryan Farbacher	Electrical Engineering	Investigating Visible Light Communication through Free Space and Underwater with Applications for Delay Tolerant Networks	C. Nelson, H. Ngo, O. Walker
59	Junior Toriano	Electrical Engineering	Simulating Schedule Delays and Curtailment for Household Appliances with Deterministic Load Profiles Using Model Predictive Control	D. Opila
60	Alanna Julius	Electrical Engineering	Stereolithography 3D Printed Cavity Antennas	C. Smith
61	Reid Freeman	Electrical Engineering	Optimization and Characterization of 3-D Printed Lenses	C. Nelson, B. Jenkins, C. Smith
62	Nathan Lee	Electrical Engineering	Investigating the Effects of Humidity on Optical Turbulence in the Near-Maritime Environment through Machine Learning	C. Nelson, C. Brownell
63	Eli Williams	Electrical Engineering	Shrinky-Dink based Millifluidic Patch Antennas	C. Smith
64	Ollie Shapiro <sup>B</sup>	Electrical Engineering	Thermal Imaging Analysis to Characterize Solid State Drive Operations via the Temperature Side Channel	J. Shey, J. Hill, R. Ives, O. Walker, H. Ngo, R. Rakvic
65	Eric Carey	Electrical Engineering	Parallel Acceleration of Long Low-PSL Binary Codes by Multi-Thread Evolutionary Search	G. Coxson, C. DeLozier, H. Ngo
66	Brian Palacios Paz	Cyber Science	State Action Doctrine Limitations on Private-Public Partnerships Tackling Misinformation	J. Kosseff
67	Carey Hutchens <sup>B</sup>	Computer Science	Private Set Intersection on Small, Unequal Sized Sets	D. Roche, S. Choi
68	Jack Metcalf <sup>T</sup>	Computer Science	Increasing Security Through Interpretation	D. Roche
69	Paul Zimmer	Mathematics	Various Types of Black Holes and Their Geometry	E. Ita
70	Caroline Leal	Mathematics	Finding the Maximum Bipartite Subgraph Using Eigenvalues	F. Kenter
71	Kelly Bye	Mathematics	Computational Approaches to Zero Forcing Related Processes	J. Alameda
72	Kyle Beasley <sup>T</sup>	Quantitative Economics	Monetary Regime Change in El Salvador: A Macroeconomic Analysis of Partial Cryptoization	J. Rothert, A. McQuoid
73	Jen Sun <sup>T</sup>	History	Database Design Informed by Historical Analysis: U.S. Navy Fleet Problems	M. Jones, B. Nguelifack
74	Landon Clouse <sup>T</sup>	History	Emergence of the Orbital Age: American Spaceflight following the <i>Columbia</i> Accident	B. VanDeMark
75	Taylor Robinson	Naval Architecture and Ocean Engineering	Selection Process of Optimum Hull and Electric Motor	M. Morabito, T. Greene

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76	Nick Moussa	Naval Architecture and Ocean Engineering	The Impact of Tubeworm Fouling on Ship Powering	M. Schultz
77	Grant Nichols	Naval Architecture and Ocean Engineering	Hydrodynamic Efficient Derig Buoy To Mitigate Mooring Tension	J. Gibbs
78	Karsten Francis, Justin Irwin	Naval Architecture and Ocean Engineering	Electro-Stimulation of Oysters	T. Johnson, D. Farrell
79	Michelle Eckhoff, Alden Fitts	Naval Architecture and Ocean Engineering	An Experimental and Analytical Study on Wave-Structure Interaction	S. Mouring, T. Johnson, R. Tran
80	Nicholas Hilaire <sup>B</sup>	Naval Architecture and Ocean Engineering	Coastal Vulnerability Assessment and Resilience Framework at the United States Naval Academy	T. Johnson, L. Velasquez-Montoya
81	Nick Rieker	Naval Architecture and Ocean Engineering	Using Satellite Images and an Open Source Least-Cost Path Algorithm to Track Coastal Inlet Openings	L. Velasquez-Montoya
82	Mckenna Brophy	Naval Architecture and Ocean Engineering	Simulation of Estuarine Salt Plug Formation	L. Velasquez-Montoya
83	Spencer Eves	Naval Architecture and Ocean Engineering	Effects of Storage Pods on a Non Body-of-Revolution Submersible Near the Surface	J. Gibbs
84	Patrick McDonald	Naval Architecture and Ocean Engineering	Self-Propelled Semi-Submersible Seabase	J. Falls
85	Beth Miller	Naval Architecture and Ocean Engineering	Subsurface Storage	L. Sung
86	Faith Brooks	Naval Architecture and Ocean Engineering	The Implementation of Additive Manufacturing (AM) in the United States Navy to Address Part Scarcity and Obsolescence	A. Laun
87	Stuart Fechhelm	Naval Architecture and Ocean Engineering	Scaling Effects and Nonlinear Contributions to HOWC Design	L. Sung
88	Rory Hagerty	Naval Architecture and Ocean Engineering	Automating the Breaker Type Classification	L. Sung
89	Arianna Smith	Naval Architecture and Ocean Engineering	Dry Combat Submersible Submerged Resistance Testing	J. Gibbs
90	Blaise Hayden	Naval Architecture and Ocean Engineering	Climate Adaptation Utilizing Wave Focusing Technology	L. Sung
91	Aidan Leavy, Mark Ostrowski, Mark Postma	Naval Architecture and Ocean Engineering	Semi-Submersible Design Using a Physics-Based Digital Model	L. Sung
92	Maeve DeBuse	Oceanography	Evaluation of Elevation, Slope, Roughness and Vegetation Type on the Burn Severity of the 2020 Calwood Fire in Boulder County, Colorado	P. Guth

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93	Joshua Valdez	Oceanography	Validated ICESat-2 Dynamic Ocean Topography with Seasonal Ice Zone AXCTD Dynamic Heights	S. Gallaher
94	Charles Dunn	Oceanography	Analyzing the Impact of Slope, Elevation, Roughness, and Vegetation Type on the Severity of the 2020 Bighorn Fire in Tucson, AZ	P. Guth
95	Margaret-Irene Norman	Oceanography	Range-Dependent Sound Propagation in the Upper Ocean During a Hurricane	E. Sanabia
96	Dillon Miller	Weapons, Robotics, and Control Engineering	Transference of Training for a DNN to Complete the Aerial Refueling Task	D. Costello, V. Mwaffo
97	Adrien Richez	Weapons, Robotics, and Control Engineering	Autonomous Unmanned Aerial System Guidance, Navigation and Control in Radio-Denied, Maritime Environment	D. Costello
98	Katie Hammonds	Weapons, Robotics, and Control Engineering	Digital Control Modeling of an Unmanned Ground Vehicle	R. O'Brien
99	John Brand	Weapons, Robotics, and Control Engineering	Vision-Based Orientation Measurement of Microrobots	M. Feemster
100	Eli Walz	Weapons, Robotics, and Control Engineering	Autonomous Search and Rescue System-Computer Vision Subsystem	R. O'Brien
101	Connor Gladioux	Weapons, Robotics, and Control Engineering	Encoding Information in Reflectivity: LiDAR Barcodes	L. DeVries, K. Galloway
102	John McCarthy	Weapons, Robotics, and Control Engineering	Simulated Scattering of a Beam Carrying Orbital Angular Momentum from a Microparticle	S. Avramov-Zamurovic
103	Amanda Marie Agustin <sup>B</sup>	Weapons, Robotics, and Control Engineering	Direct-Write Lithography using Ultraviolet LEDs	H. ElBidweihy, C. Smith, P. Jaramillo Cienfuegos
104	Luke O'Hara	Weapons, Robotics, and Control Engineering	Mountain G.O.A.T.	B. Bishop
105	Michael Guertler	Weapons, Robotics, and Control Engineering	Unmanned Samara Precision Airdrop Controller	G. Piper
106	Albert Xu	Weapons, Robotics, and Control Engineering	Magnetic Localization to Support UUV Docking	P. Frontera
107	Brooke Gauthier	Weapons, Robotics, and Control Engineering	Using Artificial Neural Networks to Predict the Outcome of NHL Games	R. Broussard
108	Michael Castellanos	Weapons, Robotics, and Control Engineering	The Effects of Military Rucking on Gait: A Quantitative Analysis	P. Jaramillo Cienfuegos
109	Enzo Kim <sup>B</sup>	Weapons, Robotics, and Control Engineering	Modelling Experimental Rayleigh-Bernard Convection with a Lens System in COMSOL	S. Avramov-Zamurovic

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110	Jack Thomas	Weapons, Robotics, and Control Engineering	Characterization of Underwater Optical Turbulence Caused by Natural Convection Machine Learning	S. Avramov-Zamurovic
111	Charles Doherty	Weapons, Robotics, and Control Engineering	Toward Automatic Ground-truth Labeling Using Industrial Robotics and Motion Capture	D. Costello, M. Kutzer
112	Brendan Neal	Weapons, Robotics, and Control Engineering	Modeling Surface Waves to Tune Wave Energy Converters (WECs)	L. DeVries
113	Daniel Shen	Weapons, Robotics, and Control Engineering	AquaMonkey 3.0 - A Multi-Domain Intelligence, Surveillance, and Reconnaissance Robot	B. Bishop
114	Maximilian Camuzzi	Weapons, Robotics, and Control Engineering	Formation Control and Obstacle Avoidance of Planar Mobile Robots Using Spatial Depth AI Camera	V. Mwaffo
115	Bryan Wei	Weapons, Robotics, and Control Engineering	Optimization Based Trajectory Generation for High Speed Autonomous Ground Vehicles	J. Dawkins
116	Fjordia Akhtar	Weapons, Robotics, and Control Engineering	Investigating Control of Spatial Coherence in Beams Carrying Orbital Angular Momentum	S. Avramov-Zamurovic, C. Nelson
117	Ashley Chung	Weapons, Robotics, and Control Engineering	Distributed Clock Synchronization using Swirls Hashgraph Algorithm	J. Dawkins
118	Graham Lindner	Weapons, Robotics, and Control Engineering	Deployment of Wildfire Detection Deep Neural Networks	R. Broussard
119	Jay Beatmann	Weapons, Robotics, and Control Engineering	Reinforcement Learning Control for Safe Navigation of Unmanned Surface Vehicles	K. Kiriakidas
120	Nick Bostock	Weapons, Robotics, and Control Engineering	YP689 Flow Fuel Model Verification for Dynamic Interface Flight Test	D. Costello
121	Owen O'Malley	Weapons, Robotics, and Control Engineering	Strip Blister Modeling and Investigation	S. Avramov-Zamurovic
122	Peter Barrette	Weapons, Robotics, and Control Engineering	Non-Intrusive Measurement of Equipment State with "The Barnacle"	J. Donnal
123	Riley Cushing	Weapons, Robotics, and Control Engineering	Modeling the CushArm Robotic Manipulators onboard RSat	L. Devries
124	Michael Pyle	Weapons, Robotics, and Control Engineering	Predicting Performance in Professional Sports Using an Artificial Neural Network	J. Esposito
125	Max Plum	Aerospace Engineering	Analysis of Articulating Nosecones for Hypersonic Bodies	D. Miklosovic
126	Dylan Black, Cole Shen	Aerospace Engineering	Hover Performance of Helicopters in Confined Spaces	J. Milluzzo
127	Jack Brake <sup>B</sup>	Aerospace Engineering	Novel Thruster Measurement Using Spin-Target Angular Displacement Apparatus	J. Kang
128	Holman Trono	Aerospace Engineering	System Identification of a Transitioning Aircraft	O. Juhasz



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129	Luke Termorshuizen	Aerospace Engineering	Aerodynamic Characterization of Modern Naval Vessels using Computational Fluid Dynamics	D. Miklosovic
130	Jackee Gwynn	Aerospace Engineering	Heat Treatment of Additively Manufactured Hybrid Rocket Fuel Grains	J. Kang, J. Catina
131	Alex Romano	Aerospace Engineering	Distance Simulation Method for Space Applications of Laser Wireless Power Transfer	J. Kang, M. Sanders
	Late Posters			

T = Trident Scholar  
 B = Bowman Scholar

Note: Many of these projects are on-going and will be continued in the spring semester. A few posters will not have midshipman presenters (due to conflicts with exams).

More information about midshipman research can be found at:  
<http://www.usna.edu/AcResearch/MidResearch/>

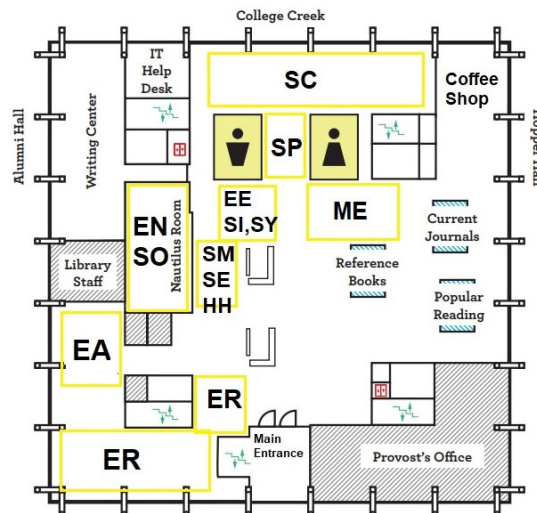
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### Nimitz Library 1st Floor



Approximate Poster Locations of Departments:

- ME = Mechanical Engineering
- SP = Physics
- SC = Chemistry
- EE = Electrical and Computer Engineering
- SI = Computer Science
- SY = Cyber Science
- SM = Mathematics
- SE = Quantitative Economics
- HH = History
- EN = Naval Architecture and Ocean Engineering
- SO = Oceanography
- EA = Aerospace Engineering
- ER = Robotics and Control Engineering

**Map Key**

- Restrooms
- Stairs
- Elevator