Andrew D. Mullen, Ph.D.

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SUMMARY

- Engineering leader and project manager with expertise in imaging, sensing, robotics, and mechatronic systems.
- Key contributor on NASA/NSF projects totaling $17M, collaborated with 20 institutions in 5 countries on 12 initiatives.
- Directed full system lifecycles from design and prototyping through deployment in extreme marine and polar settings.

EDUCATION

2018	Ph.D.	Electrical Engineering	University of California San Diego
2015	M.S.	Oceanography	University of California San Diego, Scripps Inst. of Oceanography
2011	B.S.	Civil Engineering	University of Notre Dame, *Magna Cum Laude*

PROFESSIONAL EXPERIENCE

2022-2024 Senior Engineer / Visiting Scientist — Sensing & Robotics Engineer Cornell University

- *Project Lead, Deep-Sea Robotic Sensor Package*: Developed custom sensing system within a $7.1M NASA initiative, leading 5-person team in 6-month build. Engineered real-time data visualization (Python), electromechanical systems (pressure vessel, embedded computing, power), and integration of 8 sensors (sonar, chemical, physical, sampling).
- *Instrumentation Lead, ROV Exploration*: Conducted first-of-their-kind ROV dives into a hypersaline brine pool. Initiated commercial ROV partnership, integrated $200k+ payload, and coordinated with 13-person team on 10 dives.
- *Field Engineering Lead, Arctic Geophysics*: Demonstrated sensor capabilities for planetary exploration (NASA, $2.4M).

2019-2021 NASA Postdoctoral Fellow — Imaging & Robotics Engineer NASA & Georgia Tech

- *Project Lead, Autonomous Submersible Holographic Microscope*: Built a submicron-resolution life detection instrument in collaboration with JPL (NASA, $160k+). Engineered the optics (camera, laser, lenses), electromechanics (pressure vessel, embedded computing), and image processing (Python/OpenCV, particle tracking). Deployed system on a robot in Antarctic, observed microbial motility, and demonstrated planetary mission technologies.
- *Project Engineer, Icefin Underwater Robot*: Executed 50+ sub-ice robotic missions across five Antarctic campaigns collecting critical environmental data (NASA/NSF, $5.6M). Collaborated with 9-member team to test, improve, and deploy the robot which integrates perception (sonar, imaging), navigation (IMU, ADCP), power, and actuation.
- *Co-lead, Europa Mission Concept*: Delivered novel payload design, directing 21-person team within $2M NASA effort.

2012-2018 NSF GRFP PhD Fellow — Imaging & Instrumentation Engineer UC San Diego

- *Underwater Imaging*: Co-developed first-ever digital seafloor microscope, integrating precision optics (microscopic objective, darkfield illumination, tunable lens), microsecond timing, and custom electronics (NSF, $150K+).
- *Computer Vision*: Built imaging velocimetry and feature detection pipelines, delivering novel ecological data (Matlab).
- *Operations*: Executed 90+ deployments using robotics and SCUBA, coordinating multiple international teams.

MANAGEMENT, OPERATIONAL, TECHNICAL

- *Project Management*: requirements definition, stakeholder coordination, timelines, reports [Asana, MS Office]
- *Field Operations*: 20+ campaigns, 200+ system deployments, including Antarctica, Arctic, Pacific [AAUS Diver, WEMT]
- *Software*: computer vision, image processing, data analysis, system controls [Python, Matlab, OpenCV, PyTorch]
- *Optics*: computational imaging, Fourier optics, microscopy, optomechanics, optoelectronics [Zemax]
- *Mechanics*: CAD, 3D printing, pressure housing, o-ring seals, optical ports, fluidic manifolds [SolidWorks]
- *Electronics*: embedded cameras, sensors, computers, microcontrollers, PCB design [Eagle, RPI, Arduino]

AWARDS, PUBLICATIONS, MEDIA

- *Awards*: 8 including NASA Postdoctoral Fellowship, NSF Graduate Fellowship, Microscopy Today Innovation Award
- *Publications*: 17 peer-reviewed articles (300+ citations) including Nature, Nature Comms, Science Advances
- *Media*: Featured in 50+ outlets including NYT, BBC, WSJ, PBS, Scientific American, Nature, Science, Wired