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 Robotics Sensor Package*: Led 5-person team in rapid 6-month build within $7.1M NASA initiative. Directed development of real-time data visualization (Python), electromechanical systems (pressure vessel, embedded computing, power distribution), and integration of 8 sensors (sonar, chemical, physical, sampling).
- *Instrumentation Lead, ROV Brine Pool Exploration*: Initiated commercial ROV partnership, integrated $200k+ sensor package, and coordinated with 13-person team to perform 10 deployments and meet all mission objectives.
- *Field Engineering Lead, Arctic Geophysics*: Tested instrumentation for planetary research application (NASA, $2.4M).

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

- *Project Lead, Autonomous Submersible Holographic Microscopic*: Conceived and funded collaboration with JPL (NASA, $160k+). Designed and integrated optics (camera, laser, lenses, windows), electromechanics (pressure vessel, computer, PCB, power), and analysis pipeline (computational imaging, particle tracking, Python / OpenCV). Achieved submicron resolution, observed microbial motility, and deployed on robot in Antarctica as an ocean worlds analog.
- *Project Engineer, Icefin Underwater Robot*: Conducted 50+ robotic missions across five Antarctic campaigns (38+ weeks) in unexplored sub-ice regions (NASA/NSF, $5.6M). Collaborated with 9-member team to test, improve, and deploy vehicle which integrates perception (sonar, imaging), navigation (IMU, ADCP), power, and actuation systems.
- *Co-lead, Europa Mission Concept*: Directed 21-person team designing an instrument payload within $2M NASA effort.

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

- *Underwater Imaging Systems*: Developed precision optics (microscopic objective, darkfield illumination, tunable lens), microsecond timing, and custom electronics, attaining first-ever microscale seafloor images (NSF, $150K+).
- *Computer Vision*: Built pipelines for feature detection, imaging velocimetry, and temporal analysis (Matlab).
- *Operations*: Directed 90+ deployments using robotics and SCUBA, coordinating multiple international teams.

MANAGEMENT, TECHNICAL, OPERATIONAL

- *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]

PUBLICATION & AWARD HIGHLIGHTS

- *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
- *Awards*: 8 including NASA Postdoctoral Fellowship, NSF Graduate Fellowship, Microscopy Today Innovation Award