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Date of Birth: August 11, 1958
Place of Birth: Juneau, Alaska
Nationality: USA

EDUCATION:

B.S. University of Maine, Surveying Engineering, 1980.
M.S. The Johns Hopkins University, Computer Science, 1986.

PROFESSIONAL EXPERIENCE:

Senior Engineer, Deep Submergence Laboratory, Dept. of Applied Ocean Physics & Engineering, Woods Hole Oceanographic Institution, 2000-present.

Research Engineer, Deep Submergence Laboratory, Dept. of Applied Ocean Physics & Engineering, Woods Hole Oceanographic Institution, 1990-2000.

Adjunct Research Engineer, Institute for Exploration, Division of the Sea Research Foundation, 1999- 2013.

Consultant, Navigation Processing, Imagery Collection, Data Processing, Software Engineering, 1989-present.

Senior Engineer, Ocean Engineering Program, The Johns Hopkins University, Applied Physics Laboratory, 1986-1990.

Associate Engineer, FBM Navigation Group, The Johns Hopkins University, Applied Physics Laboratory, 1983-1986.

Scientist, Imagery Exploitation Division, Autometric, Inc., Falls Church, VA 1981-1983.

Surveyor, Western Geophysical Corp., Dhahran, Saudi Arabia, 1980-1981.

AWARDS:

Selected as The Outstanding Maine Engineering Graduate of 1980.

PROFESSIONAL AFFILIATIONS:

Member, Tau Beta Pi

Member, Phi Kappa Phi
Member, American Society of Photogrammetry and Remote Sensing
Member, IEEE

RESEARCH INTERESTS:
Exploitation of remotely sensed imagery and navigation data, Geomatics

PROFESSIONAL ACTIVITIES:
WHOI:

Technical Staff Committee
Thesis Committee for Nicholas Macfarlane
Retirement Task Force
Access to the Sea Committee
Search Committee, Director of Marine Operations
Data Committee

Outside WHOI:

Invited participant/Team leader, Comparative Assessment of Visual Survey Tools, a NOAA Workshop

SUPERVISION AT WHOI:
Supervised Steve Gegg 1991-1994, 1997-2009
Supervised summer student, 2011, 2014

CRUISE PARTICIPATION:
1983 USS Florida, SSBN 728 Demonstration and Shakedown Operations
1984 USS John C. Calhoun, SSBN 653 Demonstration and Shakedown Operations
1985 USS Mariano Vallejo, SSBN 658 Demonstration and Shakedown Operations
1986 USS Georgia, SSBN 729 Demonstration and Shakedown Operations
1989 Tests of Towed Survey Vehicle, San Diego and Carr Inlet
1990 Jason Project with the Jason ROV, Survey of the Hamilton and Scourge, Lake Ontario
1990 Survey with Jason ROV and DSL-120 side scan, DSVSS Laney Chouest,Hood Canal
1991 Crest Expedition, Survey of the Juan de Fuca Ridge with the Jason ROV and the DSL120 side-scan, DSVSS Laney Chouest
1992 ARSRP Reconnaissance Program, Survey of the Kane Fracture Zone R/V Maurice Ewing, Hawaii HMR-1 Side Scan Sonar
1993 Jason Project with Jason ROV, DSVSS Laney Chouest, Sea of Cortez
1993 ARSRP High Resolution Survey (Mid Atlantic Ridge) with Jason ROV, DSL-120, R/V Knorr
1994 Survey with DSL-120 and Argo II of the TAG Mound, Mid Atlantic Ridge, R/V Knorr
1996 Jason Project with NR-1, Florida Marine Sanctuary, DSVSS Carolyn Chouest
1996 Lucky Strike Exploration (LUSTRE 96) with DSL-120, Argo II, Jason ROV, R/V Knorr
1996 Jason/Medea, ABE expedition to the Juan de Fuca Ridge, R/V T.G. Thompson
1997 Jason/Medea, Argo II, DSL-120 Survey of the MV Derbyshire Philippine Sea,

R/V T.G. Thompson
1998 Jason/Medea, Jason Project IX, Sea of Cortez, R/V Atlantis
1998 Jason/Medea, Mid Ocean Ridge mapping, Juan de Fuca Ridge,R/V T.G. Thompson
1999 Jason/Medea. DSL-120, Survey of Phoenician shipwrecks, Mediterranean Sea, M/V Northern Horizon
1999 Jason/Medea, Mid Ocean Ridge mapping, Juan de Fuca Ridge, R/V T.G. Thompson
1999 NR-1 Survey of EgyptAir 990 wreckage, DSVSS Carolyn Chouest
2000 Jason/Medea, Mid Ocean Ridge mapping, Juan de Fuca Ridge, R/V T.G. Thompson
2000 Jason/Medea, Carbonate Studies, Eel River Margin, R/V T.G. Thompson
2001 Jason/Medea, Mid Ocean Ridge mapping, Juan de Fuca Ridge, R/V T.G. Thompson
2001 DSL120A Field Trials, Okinawa to Papua New Guinea, R/V Melville
2002 Jason 2/Medea, Sea Trials, R/V Atlantis
2002 SeaBed AUV operations on George's Bank, F/V Kathy Marie
2002 Jason 2/Medea, Mid Ocean Ridge mapping, Juan de Fuca Ridge, R/V Atlantis
2003 Habcam sea trials/test, R/V Oceanus
2003 Isis ROV Sea Trials, Bahamas, R/V Atlantis
2003 Marianas Fore Arc: DSL120A and Jason II, R/V Thomas Thompson
2003 Black Sea Archaeological Expedition: Hercules ROV, R/V Knorr
2004 Mountains of the Sea, Hercules ROV , R/V Ron Brown
2004 H2O Recovery: Hawaii to Alaska, Jason II, R/V Revelle
2005 Lost City, Hercules ROV, R/V Ron Brown
2005 Visions05, Juan de Fuca, Jason 2, R/V Thomas Thompson
2006 Black Sea Expedition, Hercules, ROV R/V Endeavour
2006 Habcam Operations, F/V Kathy Marie
2006 Kilo Moana/Jason feasibility cruise, R/V Kilo Moana
2007 AGAVE Test Cruise, Arctic Ocean, Towed Vehicle Camper, Icebreaker Oden
2007 Alvin Engineering Trials, San Diego, R/V Atlantis
2007 Jason/Medea, Juan de Hawaii, R/V Kilo Moana
2008 Alvin Engineering Trials, R/V Atlantis—Alvin dive
2008 Jason Engineering Trials, R/V Atlantis
2008 Mid-Atlantic Ridge, Jason, R/V Revelle
2009 Alvin cruise to the East Pacific Rise and Guaymas Basin, R/V Atlantis
2009 Jason 2, Rota Hydrothermal/volcanic site, R/V Thompson
2009 Habcam, F/V Kathy Marie, off New Bedford
2010 HROV Nereus cruise to Cayman Rise, R/V Cape Hatteras
2010 Jason 2, Juan de Fuca, R/V Thompson
2011 Hercules/Argus, E/V Nautilus, Black Sea
2012 ROV Jason, Cayman Rise, R/V Atlantis
2012 Habcam V4, Sea Trials and Northeast Scallop Survey R/V Hugh Sharpe
2012 Recovery of Turkish Fighter Pilot Remains, Eastern Mediterranean, Argus/Hercules, E/V Nautilus
2013 HROV Nereus cruise to Cayman Rise, R/V Falkor
2013 Shipwreck Survey, E/V Nautilus and ROV Hercules
2013 Trials of Alvin Observation and Assistance Vehicle, R/V Atlantis
2013 Alvin Sea Trials, R/V Atlantis

2014 Sentry FSM Cruise, R/V Ka`imikai-O-Kanaloa
2014 Alvin Science Verification Cruise, R/V Atlantis
2014 ROV Jason, Axial Hydrothermal Site, R/V Thompson
2014 ROV Jason, Hawaii Survey of Chemical Munitions, R/V Kilo Moana

PAPERS IN REFERREED JOURNALS AND BOOKS:

Louis L Whitcomb, Jonathan Howland, David Smallwood, Dana Yoerger, and Tim Thiel. A New Control System for the Next Generation of US and UK Deep Submergence Oceanographic ROVs. *Proceedings of the 1st IFAC Workshop on Guidance and Control of Underwater Vehicles*, GCUV '03, 9-11 April 2003, Newport, South Wales, UK (refereed paper)

Singh, H., Howland, J., Pizarro, O, Large Area Photomosaicking Underwater" , *IEEE Journal of Oceanic Engineering*, pp. 872-886, vol 29, no 3, 2004.

V.L. Ferrini, D.J. Fornari, T.M. Shank, J.C. Kinsey, S.A. Soule, S.M. Carbotte, M.A. Tivey, L.L. Whitcomb, D.R. Yoerger, and J. Howland. Sub-meter bathymetric mapping of the East Pacific Rise crest at 9 ◦50'N linking volcanic and hydrothermal processes. *Geochemisty, Geophysics, Geosystems*, 8, Q01006, 2007.

J.C Kinsey, Q. Yang , and J.C. Howland. Nonlinear Dynamic Model-Based State Estimators for Underwater Navigation of Remotely Operated Vehicles. *IEEE Transactions on Control Systems Technology*. 22(5), pp.1845-1854, 2014.

Nicholas B. Macfarlane, Jonathan C. Howland, Frants H. Jensen, and Peter L. Tyack, A 3D Stereo Camera System for Precisely Positioning Animals in Space and Time, *Behavioral Ecology and Sociobiology*, February, 2015

Howland, Jonathan C. "Video Mosaic", in Delgado, James, *Encyclopaedia of Underwater and Maritime Archaeology*, British Museum Press, 1997

Newman, J., T. Gregory, and J. Howland, Chapter 2, The Development of Towed Optical and Acoustical Vehicle Systems and Remotely Operated Vehicles in Support of Archaeological Oceanography, published in *Archaeological Oceanography*, Princeton University Press, 2008

OTHER PUBLICATIONS:

Howland, J.C. and Jourdan, D.W., "The Use of GPS in Submarine Renavigation," in Proceedings of the Institute of Navigation 1991 Annual Technical Meeting, The Institute of Navigation, Washington, DC, June 1991.

Howland, J.C., Marra, M., Potter, D.F. and Stewart, W.K., "Near-Real-Time GIS in Deep-Ocean Exploration," in Proceedings of the ASPRS/ACSM/RT 92 Convention, The American Society of

Photogrammetry and Remote Sensing and the American Congress on Surveying and Mapping, Washington, DC, pp. 428-435, August 1992.

Tucholke, B.E., Kleinrock, M.C., Stewart, W.K., Lin, J., Goff, J., Jaroslow, G., Brooks, B., Lemmond, P., Howland, J., Marra, M., Reed, T., Edwards, M., Fricke, J.R. and Herzfeld, U., "Geological and Geophysical Survey of the Mid Atlantic Ridge Flank at 25 25 to 27 10," EOS Transactions of the American Geophysical Union, Vol. 73, 1992.

Bowen, A., Fornari, D., Howland, J. and Walden, B., "The Woods Hole Oceanographic Institution's Remotely-Operated and Towed Vehicle Facilities for Deep Ocean Research, Operated for UNOLS & the U.S. Deep Sea Science Community, Information and Technical Specifications," Version 1.0, July 22, 1993.

Sulanowska, M.M., Humphris, S.E., Howland, J.C. and Kleinrock, M.C., "Detailed Analysis of the Surface Morphology of the Active TAG Hydrothermal Mound by Mosaicking of Digital Images," EOS, Transactions of the American Geophysical Union, vol. 77, p. 768, 1996.

Kleinrock, M.C., Humphris, S.E., and the Deep-TAG Team (Shaw, P., Bowen, A., Crook, T., Davis, C., Elder, R., Gleason, D., Goff, J., Goldstein, L., Handley, W., Howland, J., Hussenoeder, S., Koga, K., Lerner, S., Nakamura, K., Rashid, M., Reiser Wetzel, L., Sellers, W., Sulanowska, M., Van Dover, C. and Whitcomb, L.) 2. Detailed Structure and Morphology of the Tag Active Hydrothermal Mound and Its Geotectonic Environment, Proceedings of the Ocean Drilling Program, Initial Reports, Vol. 158, 15-21, 1996.

Lerner, S., Howland, J., Humphris, S. and Lange, W., "Interactive Inspection and Analysis of Multi-Sensor Data from the TAG Hydrothermal Vent Site," EOS, Transactions of the American Geophysical Union, vol. 77, p. 768, 1996.

Bachmayer, R., Humphris, S., Fornari, D.J., Van Dover, C.L., Howland, J.C., Bowen, A.D., Elder, R.L., Crook, T., Gleason, D.E., Sellers, W.J. and Lerner, S., "Oceanographic Research Using Remotely Operated Underwater Robotic Vehicles: Exploration of Hydrothermal Vent Sites on the Mid-Atlantic Ridge At 37 North 32 West," Marine Technology Society Journal, Vol. 32, No. 3, pp. 37-47, Fall 1998.

Howland, J.C., “Imagery Collection and Mosaicking, Derbyshire Survey 1997,” Proceedings MTS/Ocean Community Conference '98, Baltimore, Maryland, Vol. 2, pp. 1104-1108, November 1998.

Singh, H., Howland, J., Yoerger, D. and Whitcomb, L., “Quantitative Photomosaicking of Underwater Imagery,” Proceedings Oceans ’98, IEEE/OES Conference, Nice, France, Vol. 1, pp. 263-266, September/October 1998.

Howland, J.C., Singh, H., Marra, M. and Potter, D., “Digital Mosaicking of Underwater Imagery,” Sea Technology, pp. 65-69, June 1999.

Howland, J., “Digital Data Logging and Processing Derbyshire Survey, 1997,” Woods Hole Oceanographic Institution Technical Report, WHOI-99-08, July 1999.

Singh, H., Weyer, F., Howland, J., Duester, A., Yoerger, D., Bradley, A., “Quantitative Stereo Imaging from the Autonomous Benthic Explorer (ABE),” Proceedings of the Oceans ‘99 MTS/IEEE Conference, Vol. 1, pp. 52-57, Seattle, Washington, September 1999.

Whitcomb, L., Yoerger, D., Singh, H. and Howland, J., “Advances in Underwater Robotic Vehicles for Deep Ocean Exploration: Navigation, Control, and Survey Operations,” Proceedings of the Ninth International Symposium of Robotics Research (ISRR’99), Snowbird, Utah, October 1999.

Howland, J.C. and Lerner, S., “Electronic Still Camera Processing and Mosaicking,” Woods Hole Oceanographic Institution Technical Report, WHOI-99-17, December 23, 1999.

Howland, J.C. and Singh, H., “Simulation of the Deep Sea Mosaicking Process,” Proceedings Oceans ‘2000, Providence, Rhode Island, Vol. 2, pp.1353-1357, September 2000.

Singh, H., Pizarro, O., Duester, A. and Howland, J.C., “Optical Imaging from the ABE AUV,” Sea Technology, pp. 39-43, April 2000.

Eustice, R., Singh, H. and Howland, J., “Image Registration Underwater for Fluid Flow Measurements and Mosaicking,” Proceedings of Oceans 2000, Providence, Rhode Island, Vol. 3, pp. 1529-1534, September 2000.

Gilbert, L.A., H.P. Johnson, D.R. Yoerger, A.D. Bowen, J.C. Howland, and S.A. Lerner, “High resolution bathymetry of the axial valley, Endeavour Segment, northern Juan de Fuca Ridge,” EOS Transactions, AGU, 81, 2000.

Johnson, H. Paul, Susan Hautala, Maurice Tivey, Chris Jones, Janet Voight, Matthew Pruis, Irene Garcia-Berdeal, Lisa Gilbert, Tor Bjorklund, William Fredericks, Jonathan Howland, et al, “Survey Studies Hydrothermal Circulation on the Northern Juan de Fuca Ridge, EOS vol. 83 Number 18, 2002

Howland, J. and Stephen Gegg, “Analyses of the F/V Gaul Data”, WHOI Technical Memorandum WHOI – 2003-001

D.A. Mindell, H. Singh, D. Yoerger, L.Whitcomb, J.Howland, "Precision mapping and imaging of underwater sites at Skerki Bank using Robotic vehicles," in A.M. McCann and J.P. Oleson, eds., Deep-water Shipwrecks off Skerki Bank: the 1997 Survey, Journal of Roman Archaeology, Suppl. Series, pp 25-30, no 58, 2004.

Gallager, S., S. Tiwari, H. Singh, J. Howland, N. Vine, R. Taylor, and P. Rago. 2005. "High Resolution Underwater Imaging for Characterization of Habitat." In Special Session on Using Video Technology for Fisheries Applications, American Fisheries Society, 135th Annual

Meeting, Anchorage, AK, September 2005

Richard Taylor, Jonathan Howland, Hanu Singh, Andrew Girard, Paul Rago, Dvora Hart, Sanjay Tiwari, Scott Gallager, “High Resolution Underwater Imaging and Image Processing for Characterizing Essential Fish Habitat”, presented at ASLO, February, 2006

Howland, J.; Gallager, S.; Singh, H.; Girard, A.; Abrams, L.; Griner, C.; Taylor, R.; Vine, N., “Development of a Towed Survey System for Deployment by the Fishing Industry,” OCEANS 2006 , Sept. 2006. doi: 10.1109/OCEANS.2006.307098.

Howland, J.; Farr, N.; Singh, H., “Field Tests of a New Camera/LED Strobe System” OCEANS 2006 , Sept. 2006. doi: 10.1109/OCEANS.2006.307142.

J.C. Kinsey, L.L. Whitcomb, D.R. Yoerger, J.C. Howland, V.L. Ferrini, and Ø. Hegrenæs. New navigation post-processing tools for oceanographic submersibles. In Eos Trans. AGU, 87(52), Fall Meet. Suppl., 2006. Abstract OS33A-1678.

Bowen A., et al., “The Nereus Hybrid Underwater Robotic Vehicle for Global Ocean Science Operations to 11,000m Depth,” presented at Oceans 2008.

Scott Gallager, York, A, Howland, J, Taylor, R, Vine, N, Prasad, L., Swaminagayan, S, mayer, L., Rzhanov, Y, Rosencranz, G, Hart, D., Rago, P., “Development of Advanced Technologies for Surveying Sea Scallops and Other Benthic Organisms”, Joint Airborne LIDAR Bathymetry Technical Center of Expertise Coastal Mapping and Charting Workshop, 2008

Taylor R., et al., “Evolution of a Benthic Imaging System from a Simple Towed Camera,” presented at Oceans 2008.

A. Bowen, D. R. Yoerger, C. Taylor, R. McCabe, J. Howland, D. Gomez-Ibanez, J. C. Kinsey, M. Heintz, G. McDonald, D. B. Peters, B. Fletcher, C. Young, J. Buescher, L. L. Whitcomb, S. C. Martin, S. E. Webster, and M. V. Jakuba. “The Nereus hybrid underwater robotic vehicle” Underwater Technology: The International Journal of the Society for Underwater Technology, 28(3):79–89, 2009.

Louis L. Whitcomb, Michael V. Jakuba, James C. Kinsey, Stephen C. Martin, Sarah E. Webster, Jonathan C. Howland, Chris L. Taylor, Daniel Gomez-Ibanez, Dana R. Yoerger. “Navigation and Control of the Nereus Hybrid Underwater Vehicle for Global Ocean Science to 10,903 m Depth: Preliminary Results.” Proceedings of the 2010 IEEE International Conference on Robotics and Automation. IEEE (2010). In Press.

Daniel Gómez-Ibáñez, C. L. Taylor, M. C. Heintz, J. C. Howland, D. R. Yoerger, A. D. Bowen,L. L. Whitcomb. “Energy Management for the Nereus Hybrid Underwater Vehicle,” Proceedings of the 2010 MTS/IEEE Oceans Conference (2010).

Jonathan Howland, Macfarlane, N, and Tyack, P., “Precise Positioning of Marine Mammals Using Stereo Photogrammetry,” Proceedings of the 2012 MTS/IEEE Oceans Conference, 2012.

Nicholas MacFarlane, Howland, J, Hentsen, F, Verborgh, P., Gauffier, P., de Stephanis, R., Hutchinson, B., and Tyack, P., "Quantitative Estimates of Group Cohesion Using a Novel Stereophotogrammetric Geocoding System", 20th Biennial Conference on the Biology of Marine Mammals, 2013.

PRESENTATIONS AT MEETINGS AND INVITED LECTURES:
(in addition to those associated with the above proceedings)

Howland, J., Computing in the Jason ROV Program, presented to the New England Chapter of the Association of Computing Machinery, Boston, Massachusetts, February 1994.

Howland, J., Stewart, W.K. and Maffei, A.R., "Collaboration of Shipboard and Shore-Based Researchers Using a Shipboard LAN Connected to the Internet," Poster presented at the Fall AGU Meeting, San Francisco, California, December 1995.

Singh, H., Howland, J., Duester, A., Bradley, A. and Yoerger, D., "Quantitative Stereo Imaging from the Autonomous Benthic Explorer (ABE)," presented at the Symposium on Autonomous Underwater Vehicle Technology, Monterey, California, 1996.

Whitcomb, L., et al., *Navigation and Control of the Nereus Hybrid Underwater Vehicle for Global Ocean Science to 11,000m Depth: Preliminary Results*, presented at 14th Yale Workshop on Underwater Robotics, 2008

MAJOR PROJECTS:

Served as Principal Investigator or Technical Lead of the following projects:

1990-1995	Video Processing System, Navy Electronics Logistics Office
1993-1996	Jason/Medea Telepresence Workshop, ONR
1995-1998	Visual Processing and Analysis Systems, Navy Electronics Logistics Office
1995-1997	High Resolution Image Capture System, Battelle, Inc.
1996-1997	Digital Imaging, Green Technical Award
1996-1997	Mosaicking and Stereo Analysis Systems, MRJ, Inc.
1997-1998	Tactical Image Survey System, Battelle, Inc.
1997-1998	Derbyshire Visual System and Stereo Analyses U.K. DETR, via NSF
1998-2000	Mission Planning and Analysis System, Navy Electronics Logistics Office
1998-2000	Development of Imaging Capabilities for the NUWC UUV, NUWC
1999-2000	Derbyshire Courtroom System, U.K. DETR
1999-2000	Closure of Benthic Optical Properties, ONR
1999-2000	Processing of Hamilton/Scourge Data, City of Hamilton, Ontario
2000-2008	Optical Imaging Support, SAIC Corporation
2001-2004	Development of Towed Scallop Assessment System, Northeast Consortium
2002-2003	Hercules Software Support, Institute for Exploration
2002-2003	Development of Electronic Still Camera, Southampton Oceanography Center

2003-2004	Analysis of F/V Gaul Data, U.K. DETR
2005-2008	Use of Habitat Mapping Sled for Scallop Abundance Estimates
2006-2008	Development of Electronic Still Camera for Institute For Exploration
2006-2007	Development of Camper vehicle for Arctic Sampling
2007-2008	Development of Still Camera for Bluefin Robotics
2005-2010	Development of new LBL System
2008-2013	Replacement of all navigation software in Jason and other systems
2008-2011	Integration of USBL into Jason operations
2005-2009	Development of Nereus Imaging and Lighting Systems
2010-2012	Development of new Stereo Imaging Vehicle for Scallop Surveys
2009-2013	Development of Marine Mammal Geopositioning System
2008-2014	Command and Control Lead for Alvin submarine replacement
2011-2014	Imaging Lead for Alvin submarine replacement
2011-2014	Development of Diffuse Flow Measurement System
2007-2014	Development of Camera and Data systems for use on Fiber Optic Towcam
2012-2014	Development of a Shallow Water Observatory for OIST
2014-	Development of an 11000 HROV for SOI, Command and Control Lead