

# Curriculum Vitae

September 5, 2022

## Bilal M. Ayyub, PhD, PE, Dist.M.ASCE, Hon.M.ASME, F.SEI, F.SNAME, F.SRA

Professor of Civil and Environmental Engineering  
Director of the Center for Technology and Systems Management (CTSM)  
Professor of Applied Mathematics and Scientific Computation  
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                                      <https://scholar.google.com/citations?user=Sp6bOh4AAAAJ&hl=en>  
(Citations 11380, h-index 46, i10-index 149 as of January 2022)

### Education

- Doctor of Philosophy, Civil Engineering, 1983, Georgia Institute of Technology, Atlanta
- Master of Science in Civil Engineering, 1981, Georgia Institute of Technology, Atlanta
- Bachelor of Science in Civil Engineering, 1980, Kuwait University

### Academic Positions and Professional Experiences

1. Academic Positions at UMD
  - Professor of Civil and Environmental Engineering, since 1993.
  - Affiliate Professor of Institute for Systems Research (ISR), 2022-2025.
  - Professor of Applied Mathematics and Scientific Computation (AMSC), since 2009.
  - Affiliate Professor of Reliability Engineering, since 1996.
  - Director, Center for Technology and Systems Management (CTSM), 1996-present. URL: <http://www.ctsm.umd.edu>.
  - Co-Director (with Dr. Robert Finkelstein) of the Intelligent Systems Laboratory (ISL), in a strategic alliance with the National Institute of Standards and Technology (NIST), 2002-2010.
  - Group Coordinator of Project Management Program, 1997-2001.
  - Group Coordinator of Structural Engineering Program, 2003-05 and 2013-14.
  - Member of the Executive Committee, 1999-2001, 2003-05, 2013-14.
  - Sabbatical Leave, Visitor, National Security Analysis Department, Applied Physics Laboratory, The Johns Hopkins University, 2014-15.
  - Sabbatical Leave Fellowships, American Society of Engineering Education (ASEE), funded by the Office of Naval Research (ONR), US Navy (USN), Carderock Division of the Naval Surface Warfare Center (CDNSWC), 1993-1994, 2000-01, and 2007-08.
  - Associate Professor, 1988-1993; Assistant Professor, 1983-88; Lecturer, 1983.
2. Academic Positions Elsewhere
  - Chair Professor, College of Civil Engineering, Tongji University, Shanghai, China, 2016-18.  
Note: The College of Civil Engineering at Tongji University has more than 400 staff members including 96 full professors and 126 associate professors, and houses the largest and most prominent civil engineering programs in China. <http://civileng.tongji.edu.cn/en/>
  - Co-director (with Professor Hongwei Huang and Michael Beer), International Joint Research Center for Resilient Infrastructure (ICRI), Tongji University, Shanghai, China, 2021-present.

### 3. Professional Experience

- Visitor, National Security Studies Department, Applied Physics Laboratory, The Johns Hopkins University, Laurel, MD, 2014-15
- Consulting Professor, CDNSWC, USN, MD, 1994-1997.
- Consulting Board Member, Al-Othaim Holding Company and L'AZURDE Group, Riyadh, Saudi Arabia, 2006-07.
- Director, WellCore Health Network (formerly Laburnum Networks), 2008-2009.
- Laboratory Engineer, Department of Civil Engineering, University of Kuwait, 1980.

### Awards and Recognition Certificates

- Ayyub's Edited ASCE Manual of Practice (MOP) on Hazard-Resilient Infrastructure has been recognized among the 42st Annual SIAA AM&P Network 2022 EXCEL Award Winners. The book won a bronze award in the Technical books category at <https://siaa.net/excel/2022-excel-winners/>. About The Awards: "SIAA's EXCEL Awards is the largest and most prestigious program recognizing excellence and leadership in association media, publishing, marketing and communication. From digital publishing to magazines, newsletters, newspapers, journals, books, and promotional content—the EXCEL Awards encompass every association communication vehicle."
- Appointed to the [Board on Environmental Change and Society](#) (BECS), Division of Behavioral and Social Sciences and Education (DBASSE), National Academies of Sciences, Engineering, and Medicine, Washington, DC. (2022-present)
- 2022 Editor's Award for the Best Paper published in 2021 ASCE-ASME Journal Part A. Paper by Khodam, A., Mesbahi, P., Shayanfar, M., and Ayyub, B.M., 2021, "Global Decoupling for Structural Reliability-based Optimal Design using Improved Differential Evolution and Chaos Control," ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering, 7(1), March 2021, <https://doi.org/10.1061/AJRUA6.0001097>.
- [National Academies of Science, Engineering and Medicine Certificate of Appreciation](#) for "valuable service ... for the evaluation of applications for the National Research Council Research Association Programs, Policy and Public Affairs Division, Fellowship Office, 2021.
- [ASCE President's Medal](#) "in recognition of your many efforts to bring adaptive design to the profession to help address a changing climate," upon the recommendation of ASCE President Robin Kemper, 2019.
- ASCE [Le Val Lund Award](#) for Practicing Lifeline Risk Reduction for "contributions to resilience enhancement and risk reduction for lifeline networked systems through measurement science and associated economics toward informing policy and decision-making practices," 2019.
- ASCE Infrastructure Resilience Division "in appreciation of distinguished service to the Society as Chair of the Executive Committee of the Infrastructure Resilience Division," October 2016 to September 2018.
- ASCE [Alfredo Ang Award](#) of Risk Analysis and Management of Civil Infrastructure "for technical contributions of national and international significance in risk analysis, risk management and lifecycle economics of civil infrastructure, including resilience and sustainability in a changing climate," 2018.
- Outstanding Achievement Award, Arab American Association of Engineers and Architects, 2018.
- Letter of Appreciation, [National Academies](#) of Sciences, Engineering and Medicine, and National Research Council, in recognition of service as a member of the Committee to Review the Fourth National Climate Assessment of the Division on Earth and Life Studies, 2018.
- Speaker on Communities in Harm's Way: Addressing Environmental Change and Extreme Weather Events at the Board on Environmental Change and Society of The [National Academies](#) of Sciences, Engineering, and Medicine In collaboration with Inter-Agency Forum on Climate Risks, Impacts & Adaptation, BECS Seminar (video <https://vimeo.com/259343422>), March 1, 2018.
- [Engineering News-Record \(ENR\) Excellence Award](#), selected by the editors of the Engineering News-Record for special recognition as one of the top 25 Newsmakers of 2017, April 5, 2018.
- Certificate of Appreciation in Recognition for Leadership, Dedication and Volunteerism for the ASCE 2017 Convention in New Orleans, Louisiana and organizing the technical session on "Climate Resilient Infrastructure: A Manual of Practice on Adaptive Design and Risk Management," 2017.

- Certificate of Recognition by the International Symposium on Sustainability and Resiliency of Infrastructure (ISSRI), held in Taipei, Taiwan of Delivering a Keynote Lecture on “Quantifying Resilience for Coastal Infrastructure Features: Research Needs,” 2017.
- Solberg Award for 2016, received in 2017, for his significant engineering research and development accomplishments in the field of ship survivability, American Society of Naval Engineers (Est. 1888)
- Certificate of Recognition by the International Symposium on Sustainability and Resiliency of Infrastructure (ISSRI), held in Taipei, Taiwan of Delivering a Keynote Lecture on “Climate Resilience for Critical Infrastructure.” 2016.
- Letter of Recognition, ASCE, for the presentation on “The Observational Method and Climate Change Design,” ASCE 2016 Convention in Portland Oregon.
- Certificate of Recognition, ASCE, for contributions to the program and success of the ASCE 2016 Convention in Portland Oregon.
- Certificates of Appreciation for Active, Impartial and Significant Contribution as an International Evaluator, Shota Rustaveli National Science Foundation, Tbilisi, Georgia, 2013 and 2014.
- Certificate of Gratitude for Active, Impartial and Significant Contribution as an International Evaluator, Georgia National Science Foundation, Tbilisi, Georgia, 2010.
- Honorable Recognition Award in testimony of the high regard of your associates and the deep appreciation of the society for your valued service in advancing the engineering profession, SERAD, ASME, 2009.
- Certificate of recognition, awarded on the historic occasion of ASME Codes and Standards 125<sup>th</sup> anniversary for dedicated voluntary service, 2009.
- USACE, the Army Commander’s Award for Public Service to recognize service and achievements that contribute significantly to the accomplishment of the mission of USACE by their contributions to the Interagency Performance Evaluation Taskforce on the development of the risk model for the hurricane protection system of New Orleans in response to Hurricane Katrina, this award for Public Service is the fourth highest honor the United States Department of the Army can bestow upon a civilian, 2007.
- Certificate awarded by the Board of Governors for service as the Chair of the Safety Engineering and Risk Analysis Division (SERAD), ASME, 2005-06.
- Certificate of recognition for outstanding service for Charring Panel HS-4 on Design Philosophies of the Hull Structure Committee, Society of Naval Architects and Marine Engineers (SNAME), 2005.
- Listed in the Marquis Who's Who:
  - Who’s Who in the World, since 1995.
  - Who’s Who in Science and Engineering, since 1994.
  - Who’s Who in Finance and Industry, since 1996.
  - Who’s Who in the East of the United States, since 1997.
- President’s Award, ASNE, 2005.
- The State of Maryland Governor’s Citation for “positive contributions, leadership and distinguished service ... in honor and appreciation of your selfless efforts on behalf of the community,” signed by Governor Paris N. Glendening, and Secretary of State John J. Willis, 2003.
- Certificate of Appreciation for Contributions to the Classification Guide of the Mobile Offshore Base, ONR Science and Technology Program, USN, 1999.
- Certificate of Appreciation, Risk-Based Inspection Guidelines Research Task Force, American Society of Mechanical Engineers (ASME), 1998.
- Walter L. Huber Civil Engineering Research Prize, ASCE, 1997.
- K.S. Fu Professional Service Award, North American Fuzzy Information Processing Society, 1995.
- U.S. Army Corps of Engineers (USACE) Award in recognition of contributions to the success of the 1995 Corps of Engineers Structural Engineering Conference, Fort Worth District, San Antonio, TX, 1995.
- Edmund Friedman Young Engineer Award for Professional Achievement, ASCE, 1989.
- Outstanding Research Oriented Paper, J. Water Resources Planning and Management, American Society of Civil Engineers (ASCE), 1987.
- The only multiple-recipient of the "Jimmie" Hamilton best paper award, Naval Engineers Journal (NEJ), American Society of Naval Engineers (ASNE), 1985, 1992, 2000, 2003 and 2004.

## Appointments and Leadership Position

Keynote speaker at many other symposia, workshops and conferences worldwide that are not listed.

- Certificate of Recognition of Providing Insightful and Intriguing 2019 IMECE Plenary Session for the Safety Engineering, Risk and Reliability Analysis Division, SERAD, IMECE, ASME, 2019.
- The 2019 Le Val Lund Lecture on Lifeline Infrastructure and Community Resilience, titled “Climate-Resilient Infrastructure: Adaptive Design and Risk Management,” CalTech, University of Southern California and ASCE, November 2019.
- The 2019 Kececioğlu Memorial Lecture on the Resilience of Infrastructure Systems: Quantification and Valuation, University of Arizona, Tucson, AZ, September 2019.
- Honorary Member of ASME (#1531920 since 2019 for distinguished leadership and contributions in risk analysis for the protection and lifecycle management of infrastructure systems using quantitative methods in economics and finances), member since 1990.
- Distinguished Member of ASCE (#228564 since 2017 for his leading contributions in uncertainty and risk analysis for infrastructure resilience and sustainability in a changing climate with life-cycle economics), member since 1980.
- Life Member, U. S. Naval Institute, sine 1988.
- Life Member, American Society of Naval Engineers (ASNE), since 1985.
- Member, Society of Petroleum Engineers, #3544840, 2012-2015.
- Senior Member, Institute of Electrical and Electronics Engineers (IEEE) #21740035, 1993-2015.
- Fellow, Structural Engineering Institute (SEI), since 2017.
- Fellow, Society for Risk Analysis (SRA), since 2013.
- Fellow, Society of Naval Architects and Marine Engineers (SNAME), member since 1989.
- Editor-in-Chief (Founding), ASCE-ASME Journal on Risk and Uncertainty in Engineering Systems, Part A. Civil Engineering (published by ASCE), and Part B. Mechanical Engineering (published by ASME), 2013-2021.
- Panelist on The Hoover Institution of Stanford University Capitol Hill Briefing on “Ready for Tomorrow: Seven Strategies for Climate-Resilient Infrastructure,” Panelists: Bilal Ayyub, Frank Nutter and Stacy Swann, Moderated by: Alice Hill, Senate Dirksen Office Building, June 27, 2019.
- Appointed to the National Academies of Sciences, Engineering and Medicine’s Committee on Defining a Renewal Strategy for Federal Facilities, Board on Infrastructure and Constructed Environment, the National Academies, 2019-20.
- Ayyub, B. M., and Hill, A., 2019, “Climate-Resilient Infrastructure: Engineering and Policy Perspectives,” The Bridge, National Academy of Engineering (NAE), June 2019.
- Ayyub, B. M., 2019, “System Resilience: Definitions, Quantification and Associated Economics,” Public Lecture sponsored by Kuwait University, Kuwait Institute for Scientific Research and Kuwait Foundation for the Advancement of Science, March 10, 2019.
- Ayyub, B. M., 2019, Keynote on “Disaster-Resilient Infrastructure Systems for Sustainability: Quantification and Decision Making,” at the Gulf Conference on Sustainable Built Environment, Kuwait Foundation for the Advancement of Science, March 11, 2019.
- Ayyub, B. M., 2019. Invited seminar speaker on “Climate-Resilient Infrastructure: Design Philosophy, Methods, and Associated Economics,” the Bechtel Fellows Seminar Series, Reston, MD, May 26, 2019.
- Ayyub, B. M., 2019. Invited keynote speaker on “Disaster-Resilient Infrastructure: a Manual of Practice on Assessment, Economics and Management” at the First JSCE-ASCE Joint Symposium on Infrastructure Resilience, Tokyo, Japan, May 22, 2019.
- Ayyub, B. M., 2019. Invited keynote speaker by the Government of India and the United Nations Office for Disaster Risk Reduction (UNISDR) on “Climate-Resilient Infrastructure: Adaptive Design and Risk Management,” at the Second International Workshop on Disaster Resilient Infrastructure, Delhi, India, March 19-20, 2019.
- Ayyub, B.M., Distinguished Lecture at the University of Virginia, Disaster-Resilient Infrastructure: Quantification and Associated Economics, September 7, 2018.

- Ayyub, B.M., as the Director of the UMD Center for Technology and Systems Management, Co-Convener and Non-financial Sponsor of a Workshop on “Ready for Tomorrow: Achieving Climate-Resilient Infrastructure: How can we design, fund, and build resilience into public investments in infrastructure?” in collaboration with the Hoover Institution, Stanford Urban Resilience Initiative, and ASCE Committee on Adaptation to a Changing Climate, November 13, 2018.
- Appointed to the [National Academies panel to review the fourth National Climate Assessment](#), Board on Atmospheric Sciences & Climate and Board on Environmental Change and Society of the Division of Behavioral and Social Sciences and Education and the Division on Earth and Life Studies, the National Academies, 2017-18.
- Invited keynote speaker, funded by the University of Sao Paulo to ICVRAM ISUMA UNCERTAINTIES 2018 conference on Disaster Resilience of Critical Infrastructure: Coastal Systems, Florianópolis, Brazil, April 8-11, 2018.
- Invited keynote speaker by the Government of India and funded by the United Nations Office for Disaster Risk Reduction (UNISDR) and the World Bank Group on “Coastal Infrastructure and Network Resilience: Measurements and Metrics” and “Climate Resilient Infrastructure: A Manual of Practice (MoP),” the International Workshop on Disaster Resilient Infrastructure, Delhi, India, January 15-16, 2018.
- Invited keynote speaker by Taiwan Tech to the International Symposium on Sustainability and Resiliency of Infrastructure (ISSRI), held in Taipei, Taiwan on “Quantifying Resilience for Coastal Infrastructure Features: Research Needs,” 2017.
- Invited keynote speaker by the University of Newfoundland, Canada funded by the Lloyd’s Register Foundation to the Third Workshop and Symposium on Safety and Integrity Management of Operations in Harsh Environments, St. John’s, Canada, October 16-20, 2017.
- Invited keynote speaker by the University of New Mexico Resilience Institute to the Second Resilience Colloquium on Urban Resilience: Research Gaps and Implementation Roadmap on “Disaster Resilience of Infrastructure Systems: Measurement Science and Economics,” August 7-8, 2017.
- Invited keynote speaker by the US Army Corps of Engineers to the 94th Coastal Engineering Research Board Meeting on “Practical Resilience Metrics for Coastal Infrastructure Features,” Honolulu, HI, 27-28 June 2017.
- Invited keynote speaker by the International Petroleum Industry Environmental Conservation Association (IPIECA) to the Adaptation Roundtable on “Adaptive Infrastructure Design and Risk Management: Towards Climate Resilience,” April 4, 2017.
- Appointed as a panelist to the [National Research Council \(NRC\) Research Associateship Programs](#), NRC of the National Academies, 2016-19.
- Invited participant, White House (by the National Security Council, the National Economic Council, the Office of Science and Technology Policy, the Council on Environmental Quality, and the Office of Management and Budget), White House Conference on Resilient Building Codes on May 10, 2016, Washington, DC.
- Invited speaker, Interoperability Metrics for Common Technical Standards, Civil Engineering Triennial Summit 2015 sponsored by Institution of Civil Engineers (ICE), American Society of Civil Engineers (ASCE) and the Canadian Society of Civil Engineering (CSCE), December 9 – 10, 2015 in Westminster, UK.
- Advisor to Governor Martin O’Malley on Governor Emergency Management Advisory Council, 2011-2014.
- Keynote, Pacific-Rim Workshop on, Innovations in Civil Infrastructure Engineering, National Taiwan University of Science & Technology, 9 to 11 January 2013.
- Reviewer of the Intergovernmental Panel on Climate Change (IPCC), Work Group II on Impacts, Adaptation and Vulnerability: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX), 2010-2011.
- Appointed to the Committee for Assessment of the Bureau of Reclamation’s Security Program, Board on Infrastructure and the Constructed Environment, National Research Council (NRC) of the National Academies, 2006-08.
- Appointed to the working group on higher education of the transition team and the working group on homeland security of the transition team of Governor Martin O’Malley, 2006-07.

- Ayyub, B.M., (invited speaker) “Risk Analysis for Informing Strategic and Tactical Decisions,” Naval War College, Chief of Naval Operations, Strategic Studies Group, Free Form Force, Newport, RI, October 26, 2006.
- Appointed to support the federal government's Interagency Performance Evaluation Taskforce (IPET) to develop a risk analysis model of the levees and floodwalls that overtopped or breached during Hurricane Katrina in order to provide answers for use in future New Orleans protection project designs, 2005-06.
- Appointed to ASME Codes and Standards Working Group on Risk Analysis and Management for Critical Asset Protection (RAMCAP), 2005-06.
- Ayyub, B. M., (invited Distinguished Lecture by the Brazilian Research Agency) "Risk-informed Inspection of Industrial Equipment," 17th International Congress of Mechanical Engineering, COBEM2003, São Paulo, Brazil, November 2003, 10 pages.
- Co-chair of the Research Task Force to Develop ASME Guidance Document and Standard on Risk-Based Protection of Critical Assets, 2003.
- Appointed to ASME Codes and Standards Working Group on Probabilistic Methods in Design (SG-D) (SC III) (N20070365), ASME, 2003 to 2008.
- Advisor, Executive Committee, ASCE Council on Disaster Risk Management (CDRM), 2002-2012.
- Appointed to ASME Codes and Standards Working Group on Valves (SG-D) (SC III) (N20070335), ASME, May 2002 to May 2008.
- Member of the Executive Committee of SERAD, ASME, 2002-2006.
- Invited by the Executive Office of the President of the United States, Office of Science and Technology Policy to represent ASME for establishing policy and R&D priorities for protecting the nation’s physical infrastructure, the White House Conference Center, September 23-24, 2002. Acted as a prospectus leader on risk analysis methods and guidance for protecting the nation’s physical infrastructure.
- Sabbatical Leave Fellowships, ASEE, funded by the ONR, U. S. Navy, 1993-1994, 2000-2001, and 2007-2008.
- Chair of the Panel on Design Procedures & Philosophies for Ship Structures, SNAME, 1996-2005.
- Member of the Journal of Ship Research Committee, SNAME, 1997-2011.
- Chair (Editor) of the Naval Engineers Journal Committee, ASNE, 2000-2005.
- Professional Engineer Registration, State of Maryland, License Registration 05-16521, since 1988, expires 06/13/2023.
- General Chairman, the Annual Conference of the North American Fuzzy Information Processing Society (NAFIPS), University of Maryland, College Park, September 1995.
- Founder and General Chair and Organizer of the International Symposium on Uncertainty Modeling and Analysis, ISUMA90, ISUMA93, ISUMA95, ISUMA03, ISUMA11, ISUMA14, ISUMA18.
- Research Fellowship, Kuwaiti Foundation for the Advancement of Science, 1980-1983.
- BSCE with the first honor degree, 1980.

### Textbooks

- Ayyub, B. M., Risk Analysis in Engineering and Economics, Chapman and Hall/CRC Press.
  - Second edition 2014.
  - Second edition solution/instructor’s manual, 2014
  - First edition 2003.
  - First edition solution/instructor’s manual, 2003 (authored by Ayyub, B.M. and Morcos, M.)
- Ayyub, B. M., and Klir, G. J., Uncertainty Modeling and Analysis in Engineering and the Sciences, Chapman & Hall/CRC, FL.
  - First edition, 2006.
  - First edition solution/instructor’s manual, 2006.

- Ayyub, B.M., and McCuen, R., Probability, Statistics and Reliability for Engineers, Chapman and Hall/CRC Press, Boca Raton, FL.
  - Third edition, 2011, Chapman and Hall/CRC Press.
  - Third edition solution/instructor's manual, 2011, Chapman and Hall/CRC Press
  - Second edition, 2003, Chapman and Hall/CRC Press.
  - Second edition solution/instructor's manual, 2003, Chapman and Hall/CRC Press
  - First edition, 1997. Designated as a CRC Press best seller, 2002.
  - First edition solution/instructor's manual, 1997.
- Ayyub, B.M., and McCuen, R., Numerical Methods for Engineers.
  - Second edition, 2015 (new title: Numerical Analysis for Engineers: Methods and Applications) Chapman and Hall/CRC Press.
  - Second edition solution/instructor's manual, 2015.
  - First edition, 1996, Prentice Hall, NY.
  - First edition solution/instructor's manual, 1996 (authored by Ayyub, B.M., and Assakkaf, I.) Prentice Hall, NY.
- Ayyub, B. M., Elicitation of Expert Opinions for Uncertainty and Risks, CRC Press.
  - First edition, 2002.
  - First edition solution/instructor's manual, 2002.

### Edited Books and Proceedings

- Ayyub, B.M. (contributing author and a member of the main committee developed the standard), 2022 (forthcoming), ASCE 73: Standard Requirements for Sustainable Infrastructure, American Society of Civil Engineers, Reston, VA.
- Ayyub, B.M. (editor and author), Butry, D., Davis, C.A., Malushte, S., Medina, R., Taha, M., Van de Lindt, J.W., Attoh-Okine, N., Brett, C.R., Daghash, S., Field, MC., Fung, J. Gardoni, P., McNeil, S., Moreu, F., Mostatavi, A., Saadat, Y., Sharma, N., Soga, K., Soliman, E., Sutley, E.J., Tabandeh, A., Thomas, D., Vugrin, E., Wright, R.N., 2021, Hazard-Resilient Infrastructure: A Manual of Practice (MOP) on Analysis and Design, Infrastructure Resilience Division #144, American Society of Civil Engineers, Reston, VA.
- Ayyub, B. M., 2020 (Editor and Author). Thoughts and Conversations of Buildings and Other Structures. Published by CreateSpace Independent Publishing Platform, 155 pages, ISBN-10: 1497367166, ISBN-13: 978-1497367166 <https://www.amazon.com/Thoughts-Conversations-Buildings-Other-Structures/dp/1497367166> Offered by ASCE as a gift by Dr. Ayyub to its donors in its Fall 2020 fundraising campaign.
- Ayyub, B. M. (Editor and Lead Author), Medina, M., Vinson, T., Walker, D., Wright, R. N., AghaKouchak, A., Barros, A. P., Cerino, A. C., Conray, R. P., Fields, R. E., Francis, O. P., Olsen, J. R., Samaras, C., and Vahedifard, F., 2018. Climate-Resilient Infrastructure: A Manual of Practice on Adaptive Design and Risk Management. ASCE Manual of Practice (MOP) 140, American Society of Civil Engineers, Reston, VA. Interviewed by ASCE News: <https://news.asce.org/at-the-crossroads-of-civil-engineering-and-climate-change/>, Recognized by ENR 2017, Received ASCE President Medal 2019.
- Beer, M., Huang, H., Ayyub, B. M., Zhang, D., and Phillips, B. (editors), 2018, Resilience Engineering for Urban Tunnels. ISBN 978-0-7844-1513-9. Infrastructure Resilience Publication 2, Report of the First International Workshop on Resiliency of Urban Tunnels held on September 1, 2016, Workshop Proceedings, ASCE, Reston, VA, <https://doi.org/10.1061/9780784415139>.
- Ayyub, B. M., Chapman, R. E., Galloway, G. E., and Wright, R. N. (editors), 2016, Economics of Community Disaster Resilience, Workshop Proceedings, National Institute of Standards and Technology, Office of Applied Economics, NIST Special Publication 1600, Gaithersburg, MD. <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1600.pdf>
- Olsen, J. R. (editor), Ayyub, B. M., Barros, A., Lei, W., Medina, M., Samaras, C., Smith, O. P., Stakhiv, E. Z., Tan, J., Vinson, T. S., Walker, D., Wright, R. N., (lead authors), Adapting Infrastructure and Civil Engineering Practice to a Changing Climate, Committee on Adaptation to a Changing Climate, ASCE, <http://dx.doi.org/10.1061/9780784479193>, 2015.



- Ayyub, B. M., Galloway, G. E., and Wright, R. N. (editors), 2014, Measurement Science for Sustainable Construction and Manufacturing:
  - Volume I. Position Papers, National Institute of Standards and Technology, Office of Applied Economics, NIST Report NIST.GCR.15-986-1, Gaithersburg, MD. <http://nvlpubs.nist.gov/nistpubs/gcr/2015/NIST.GCR.15-986-1.pdf>
  - Volume II. Presentations, National Institute of Standards and Technology, Office of Applied Economics, NIST Report NIST.GCR.15-986-2, Gaithersburg, MD. <http://nvlpubs.nist.gov/nistpubs/gcr/2015/NIST.GCR.15-986-2.pdf>
- Ayyub, B.M., and Kearney, M. S. (Editors), Sea Level Rise and Coastal Infrastructure: Prediction, Risks, and Solutions, Series Number CDRM 6, Stock No. 41200, ASCE, Reston, VA, 2012, Top seller according to ASCE Infrastructure Resilience Division as of 2014.
- Ayyub, B.M., (Editor), Vulnerability, Uncertainty, and Risk: Analysis, Modeling and Management, Proceedings of the First International Conference on Vulnerability and Risk Analysis and Management (ICVRAM 2011) and the Fifth International Symposium on Uncertainty Modeling and Analysis (ISUMA 2011), ASCE, Reston, VA, 2011.
- Ayyub, B.M., (Editor), Risk Modeling and Vulnerability Assessment Volume in the Wiley Handbook of Science and Technology for Homeland Security, General Editor: J. G. Voller, John Wiley & Sons, Hoboken, NJ, 2009.
- Attoh-Okine, N. O., and Ayyub, B.M., (Editors), Applied Research in Uncertainty Modeling and Analysis, International Series on Intelligent Technologies, Springer Science, Germany, 2005.
- Ayyub, B.M. and Attoh-Okine, N. O., (Editors), Uncertainty Modeling and Analysis, proceedings of the Second International Symposium on Uncertainty Modeling and Analysis (ISUMA'03), IEEE-CS Press, Los Alamitos, CA, 2003.
- Ayyub, B. M., and Schmidt, M. (Editors), Fault Tree Handbook: ASME Risk-Based Handbook Version, Adapted and edited from the U.S. Nuclear Regulatory Commission, NUREG 0492, ASME, 2002.
- Ayyub, B.M., (Editor), Uncertainty Modeling and Analysis in Civil Engineering, CRC Press, 1998.
- Ayyub, B.M., and Gupta, M.M., (Editors), Uncertainty Analysis in Engineering and the Sciences: Fuzzy Logic, Statistics, and Neural Network Approach, Kluwer Academic Publisher, 1997.
- Ayyub, B.M., Guran, A., and Haldar, A., (Editors), Uncertainty Modeling in Vibration, Control, and Fuzzy Analysis of Structural Systems, World Scientific, 1997.
- Haldar, A, Guran, A., and Ayyub, B.M., (Editors), Uncertainty Modeling in Finite Element, Fatigue, and Stability of Systems, World Scientific, 1997.
- Ayyub, B.M. (Editor), Uncertainty Modeling and Analysis, proceedings of the joint third International Symposium on Uncertainty Modeling and Analysis and the conference of the North American Fuzzy Information Processing Society (ISUMA-NAFIPS'95), IEEE-CS Press, Los Alamitos, CA., 1995.
- Ayyub, B.M., and Gupta, M.M. (Editors), Uncertainty Modeling and Analysis: Theory and Applications, North-Holland-Elsevier Scientific Publishers, 1994.
- Ayyub, B.M. (Editor), Uncertainty Modeling and Analysis, proceedings of the Second International Symposium on Uncertainty Modeling and Analysis (ISUMA'93), IEEE-CS Press, 1993.
- Ayyub, B.M., Gupta, M.M. and Kanal, L.N. (Editors), Analysis and Management of Uncertainty: Theory and Applications, published by North-Holland-Elsevier Scientific Publishers, 1992.
- Ayyub, B.M. (Editor), Uncertainty Modeling and Analysis, proceedings of the first International Symposium on Uncertainty Modeling and Analysis (ISUMA'90), IEEE-Computer Society (CS) Press, Los Alamitos, CA., 1990.

### Book Chapters

- Zhang, Y., and Ayyub, B.M., 2021, “Chapter 2. Temperature Extremes in a Changing Climate,” in Climate Change and Extreme Events, Ed. Ali Fares, ELSEVIER, ISBN: 978-0-12-822700-8, pages 9-23, <https://doi.org/10.1016/B978-0-12-822700-8.00001-9>



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- Ayyub, B.M., and White, G.J., "Life Expectancy Assessment and Durability of the Island Class Patrol Boat Hull Structure," U.S. Coast Guard R&D Center, Avery Point, Groton, CT. 1988, 100 pages.
- Ayyub, B.M., Sohn, Y.G., and Saadatmanesh, H., "Static Strength of Prestressed Composite Girders," Final Report to the National Science Foundation, Grant No. CEE-8413204, 1988, 600 pages.
- Ayyub, B.M., "Structural Behavior of Prestressed Composite Steel-Concrete Beams with Coated Strands," Department of Civil Engineering, UMD, College Park, Maryland, November 1987, 75 pages.
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- Ayyub, B.M., and White, R., "Detection of Delaminations and Cavities in Concrete," The Maryland State Highway Administration, FHWA/MD-87/05, August 1987, 93 pages.
- Ayyub, B. M., and Schelling, D., "National Bridge Inventory and National Bridge Inventory Sample," UMD, American Trucking Association Study, College Park, Maryland, July 1987, 40 pages.
- Saadatmanesh, H., Albrecht, P., and Ayyub, B.M., "Analytical and Experimental Study of Prestressed Composite Girders," Interim Report to the NSF, Grant No. CEE-8413204, 1986, 148 pages.
- Ayyub, B.M., "A Practical Reliability Model for Correlated Random Variables," Final Report, General Research Board, Graduate School, UMD, College Park, Maryland, December 1985, 18 pages.
- Ayyub, B.M., and Chang, P.C., "Structural and Failure Analysis of the Empennage Group of the Bandeirante from EMBRAER, Brazil," 385-AM-85.MA004-4300-2503, The National Transportation Safety Board, Washington, DC, August 1985, 110 pages.
- Ayyub, B.M., and Alrayyis, M., "Computer Stress Analysis of Elliptic Paraboloidal Shells," Department of Civil Engineering, College of Engineering and Petroleum, University of Kuwait, February 1980, 16 pages.

### **Presentations at Conferences and Workshops**

Dr. Ayyub makes presentations at conferences, meetings and workshops on regular basis, such as ASME Risk Technology Research Committee, U. S. Coast, Underwriters Laboratories, Boating Safety Council, and Personal

Flotation Devices Manufacturing Association, ASCE and its CDRM, ASNE, and SNAME meetings. This section provides a list of only selected presentations as examples.

- Walker, D. and Ayyub, B. M., 2022, Developing Climate-Resilient Codes and Standards: Approach and Implications, 10th Annual National Capital Region Water Resources Symposium, American Water Resources Association National Capital Region, University of the District of Columbia, Washington DC, April 8, 2022.
- Ayyub, B. M., 2022, Hazard-Resilient Infrastructure: An ASCE Manual of Practice on Analysis and Design, ASCE-IRD Lifelines Conference 2022, UCLA, February 7, 2022.
- Ayyub, B. M., 2021 (panelist), Hazard-Resilient Infrastructure: Climate Science in Design and Construction, 24<sup>th</sup> Annual Process Safety Symposium, Panel discussion: “Resiliency of critical infrastructure: Are we ready for extreme events?” Mary Kay O’Connor Process Safety Center, Texas A&M Engineering Experiment Station, October 19, 2021.
- Ayyub, B. M., 2021 (keynote presentation), Hazard-Resilient Infrastructure: Practical Methodology for Analysis and Design, International Engineering Mechanics Forum, (IEMForum2021), Kanagawa University in Yokohama, Japan.
- Dzedzy, D., Mao, Y., and Ayyub, B.M., 2021, “Fractals and Rail Network Topology: Renormalization for their Identification and Characterization,” ASME Joint Rail Conference (JRC2021), April 20-21, 2021, <https://event.asme.org/Joint-Rail-Conference>
- Saadat, Y., Ayyub, B.M., Helgeson, J., and Saleem, S., 2021, “Transportation Resilience Models for Supply Chain Analysis Using Complex Network Theory (CNT),” ASME Joint Rail Conference (JRC2021), April 20-21, 2021, <https://event.asme.org/Joint-Rail-Conference>
- Mao, Y., Ayyub, B.M., Elsibaie, M., Saadat, Y., and Omar, T., 2021, “Optimizing Topology of Rail Networks: The Case of Reclassing, Acquisition and Repurposing of Tracks,” ASME Joint Rail Conference (JRC2021), April 20-21, 2021, <https://event.asme.org/Joint-Rail-Conference>
- Cao, S. Ayyub, B.M., Saadat, Y., Elsibaie, M., and Omar, T., 2021, “Topological Analytics for Vulnerability and Recovery Enhancements After Disruption of Rail Networks,” ASME Joint Rail Conference (JRC2021), April 20-21, 2021, <https://event.asme.org/Joint-Rail-Conference>
- Hamed, M.A., Ayyub, B.M., Elsibaie, M., Mao, Y., Saadat, Y., Omar, T., 2021, “Weights and their Consideration in Topological Analysis of Rail Networks,” ASME Joint Rail Conference (JRC2021), April 20-21, 2021, <https://event.asme.org/Joint-Rail-Conference>
- Roa-Henriquez, A., Helgeson, J. and Ayyub, B. M. 2021. “Characterizing Regional Disaster and Resilience in Terms of Supply Chain Effects and Input-Output Economic Data,” Production and Operations Management Society, POMS 31st Annual Conference (Online) April 30 - May 5, 2021, <https://pomsmeetings.org/conf-2021/index.html>
- Ayyub, B. M. 2021 (keynote). “Hazard-Resilient Infrastructure: Practical Methodology for Analysis and Design,” Sixth International Reliability and Safety Engineering Conference (IRSEC2021) February 17-18, 2021, Shiraz Iran.
- Ayyub, B. M. 2021. “Hazard-Resilient Infrastructure: Practical Methodology for Analysis and Design,” Japan-US Symposium on Assessment, Management, and Governance for Infrastructure Resilience, JSCE-ASCE, April 13, 2021.
- Ayyub, B. M. (invited speaker), 2018. “Climate-Resilient Infrastructure: An ASCE Manual of Practice,” Presented to the Advisory Committee on Water Information (ACWI) Water Resources Adaptation to Climate Change (WRACC) working group, 11-27-2018.
- Saadat, Y., Ayyub, B.M., Zhang, Y.J., Zhang, D.M., and Huang, H., 2019. “Vulnerability Assessment of Washington D.C. Metro Network Considering Ridership,” Transportation Research Board 2019 Annual Meeting.
- Ayyub, B. M. (invited speaker), 2018, “ASCE Manual of Practice of Climate-Resilient Infrastructure,” Industry Leaders Forum, ASCE Convention, Denver, CO.
- Ayyub, B. M., (invited speaker), 2018. “Climate Resilient Infrastructure: A Manual of Practice (MoP),” AB-2800 Climate change: infrastructure planning.(2015-2016), Climate Safe Infrastructure Working Group, California Legislative Information Assembly Bill 2800.
- Ayyub, B. M., 2018, “ASCE Infrastructure Resilience Division and the ASCE Manual of Practice of Climate-Resilient Infrastructure,” a Technical Session by the JSCE-ASCE International Research on Infrastructure Resilience, ASCE Convention, Denver, CO.

- Hu, H. L., and Ayyub, B. M., 2018, “Future Rainfall Intensity Duration Frequency Projection using Machine Learning,” Poster, Annual Conference of the Society for Risk Analysis, New Orleans, Louisiana, December 3, 2018 (received the Society for Risk Analysis Engineering Infrastructure Specialty Group (EISG) Student Merit Award, and a travel award to doctoral student H. L. Hu).
- Ayyub, B. M., Barros, A., Olsen, R. I., Vinson, T., Walker, D., Wright, R. N., “Adaptive Risk Management for Future Climate/Weather Extremes,” ASCE’s International Conferences on Sustainable Infrastructure (ICSI), New York, New Orleans, NY, October 26-28, 2017.
- Walker, D., and Ayyub, B. M., “Adapting Infrastructure and Civil Engineering Practice to a Changing Climate: Developing a Manual of Practice,” American Geophysical Union Fall Meeting, Conference, New Orleans, Louisiana, December 11-15, 2017.
- Zhang, Y., and Ayyub, B. M., “Urban Heat Projections in a Changing Climate: Washington D.C. as a Case Study,” Poster, Annual Conference of the Society for Risk Analysis, Arlington, VA, December 10-14, 2017.
- Halper, S., Saadat, Y., and Ayyub, B. M., “Seismic Retrofit of Existing Federal Buildings for Disaster Resilience- Benefit/Cost Analysis,” Poster, Annual Conference of the Society for Risk Analysis, Arlington, VA, December 10-14, 2017.
- Mishra, S., and Ayyub, B. M., “Entropy for Quantifying Uncertainty and Risk in Economic Disparity,” Poster, Annual Conference of the Society for Risk Analysis, Arlington, VA, December 10-14, 2017.
- Mishra, S., and Ayyub, B. M., “Country-based Assessment of Global Risk Profiles using Ensemble Deep Learning,” Annual Conference of the Society for Risk Analysis, Arlington, VA, December 10-14, 2017.
- Hu, H.L., and Ayyub, B. M., “Extreme Precipitation Analysis and Prediction for a Changing Climate,” Annual Conference of the Society for Risk Analysis, Arlington, VA, December 10-14, 2017 (received travel award to doctoral student H.L. Hu).
- Webb, D., and Ayyub, B. M., 2017, A Probabilistic Technique for Life Prediction of Hull Structure: Stiffened panels as an example, ASNE Technology, Systems and Ships, American Society of Naval Engineers, Hyatt Regency Crystal City, February 14-16, 2017.
- Huang, H., and Ayyub, B. M., 2017, Resiliency and Robustness on of Geostructural Systems, Panel Discussion, Geo-Risk, International Symposium on Geotechnical Safety and Risk, Denver, CO.
- Ayyub, B. M., 2016 (keynote presentation), Models for the Economics of Resilience: From Assets to Socioeconomics, Second Symposium of Quantitative Finance and Risk Analysis (QFRA 2016), June 9-10, 2016, Rhodes Island, Greece.
- Ayyub, B. M., 2016 (keynote presentation), Practical Resilience Metrics for Critical Infrastructure, International Engineering Mechanics Forum, (IEMForum2016), which is planned for July 7-8, 2016 at Kanagawa University in Yokohama, Japan.
- Vinson, T., Olsen, R., Ayyub, B. M., Wright, R., Barros, A., Walker, D., 2016, Determining Most Probable and Extreme Conditions to Apply the Observational Method to Climate Project Design, ASCE Convention, Portland, OR.
- Ayyub, B. M., 2015, Uncertainty Analysis and Modeling for National Security Studies, National Security Analysis Department, Applied Physics Laboratory, The Johns Hopkins University, Baltimore, MD.
- Ayyub, B. M., 2015, Global Catastrophic Risks with Climate Change as a Case Study, National Security Analysis Department, Applied Physics Laboratory, The Johns Hopkins University, Baltimore, MD.
- Ayyub, B. M., 2015, Global Catastrophic Risks with Climate Change as a Case Study, The Johns Hopkins University, Baltimore, MD.
- Ayyub, B. M., “DC Deluge?” WTOP Radio, <http://www.nae.edu/Projects/20730/wtop/68997.aspx>, 2013.
- Ayyub, B. M., Braileanu, H. G., and Qureshi, N., “Prediction and Impact of Sea Level Rise on Properties and Infrastructure of Washington, DC,” Risk Analysis Journal, Society for Risk Analysis, 2011 Oct 28. doi: 10.1111/j.1539-6924.2011.01710.x. Press release of the above paper by the Society for Risk Analysis and the University of Maryland on November 1, 2012 was picked up by well over 300 media outlets

- Ayyub, B. M., “Energetically Autonomous Tactical Robot (EATR)”, WAMU Interview, [http://www.civil.umd.edu/news/news\\_story.php?id=4444](http://www.civil.umd.edu/news/news_story.php?id=4444)
- Ayyub, B. M., “Electric Distribution Resilience: Is Undergrounding a Solution?” 6th Congress on Forensic Engineering, Panel Discussion: Resilience Engineering, San Francisco, CA, November 1, 2012.
- Ayyub, B. M., “On Uncertainty in Information and Ignorance in Knowledge,” Committee on Mathematical Foundation of Verification, Validation, and Uncertainty Quantification, August 23, 2010 Meeting.
- Ayyub, B. M., “Uncertainty Sources, Types and Quantification Models for Risk Studies,” The Association of Government Toxicologists at the Uniformed Services University of the Health Sciences, Bethesda, MD, October 21, 2010.
- Ayyub, B. M., “Uncertainty Sources, Types and Quantification Models for Risk Studies,” DOE Workshop on Risk Assessment and Safety Decision Making Under Uncertainty, September 21-22, 2010, Bethesda, MD.
- Ayyub, B. M., and Gavardashvili, G., “Risk-Based Security Analysis of the Hydraulic Systems in the River Network in the South Caucasus Region of Georgia, Armenia and Azerbaijan,” Science for Peace and Security Section (SPS), North Atlantic Treaty Organization (NATO), Belgium, July 6, 2009.
- Ayyub, B. M., “A Risk-Based Framework for Multi-Hazard Analysis,” Georgian Water Management Institute, April 22, 2009, Tbilisi, Georgia.
- Ayyub, B. M., “Developing an Autonomous Intelligent Vehicle: Towards Cognition,” Fourth Joint Military/Civilian Conference on Intelligent Vehicle Technology Transfer (IVTT), April 1-2, 2009.
- Ayyub, B.M., “A Risk-Based Framework for Multi-Hazard Analysis,” Virginal Tech , Northern Virginal Center, November 13, 2008.
- Ayyub, B.M., “Discussion: Perspectives Based on Engineering Risk Analysis,” Distinguished Statistics Consortium Lecture By Mitchell H. Gail, December 5, 2008, University of Maryland, College Park.
- Liebe, R. M., Scouras, J., Parnell, G., Ayyub, B.M., “Risk Analysis Frameworks for Counterterrorism,” 2nd Annual SARMA conference this year, May 13-15, 2008, Arlington, VA.
- Ayyub, B. M. (invited lecture), “A Risk-Based Framework for Managing Infrastructure,” National Taiwan University of Science and Technology, Taiwan Building Technology Center, October 24-25, 2008, Taipei, Taiwan.
- Ayyub, B. M. (invited keynote speaker), “Reclassification and Risk-Based Compliance: Statistical Analysis of Performance Tests of Personal Flotation Devices,” Marine Safety 2008 Conference, National Marine Safety Committee (NMSC), 27th–29th May 2008, Adelaide, South Australia.
- Ayyub, B. M. (invited keynote speaker), “Using Uncertainty Modeling for Marine Safety Design - A Probabilistic Approach,” Marine Safety 2008 Conference, National Marine Safety Committee (NMSC), 27th–29th May 2008, Adelaide, South Australia.
- Ayyub, B. M. (invited lecture), “Risks Analysis of Infrastructure Systems,” Kuwait Institute for Scientific Research, December 26, 2007
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology: Background information, capabilities and case studies, Presentation at the Risk Methodologies Workshop, Infrastructure Strategies and Analysis Division, Department of Homeland Security, November 14, 2007.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology, Presentation to the Baltimore Police Department, August 31, 2007.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology: Baltimore Case Study, City of Baltimore, MD, May 10, 2007.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology, Emergency Management Division, Washington Military Department, State of Washington, Camp Murray, WA, November 17, 2006.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology, Governor’s Office for Homeland Security, State of Maryland, Annapolis, MD, August 14, 2006.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology, Grants and Training, Department of Homeland Security, Washington, DC, May 11, 2006.

- Ayyub, B. M., Risks of Hurricane Protection Systems: Model Development for New Orleans and S.E. Louisiana (Volume VIII), U. S. Army Corps of Engineers, Washington, DC, May 4-6, 2006. <https://ipet.wes.army.mil/>
- Ayyub, B. M., (invited speaker) “Memetics: Establishing a Quantitative Foundation,” Defense Advanced Research Projects Agency (DARPA) Workshop, April 4-6, 2006.
- Ayyub, B. M., and Wehr, S., “Risk-based PFD Classification and Standards Proposed Vision and Plan,” Personal Flotation Devices Manufacturing Association (PFDMA), U. S. Coast Guard (Office of Boating Safety, Product Assurance Division), 2006 PFDMA Annual Conference, March 2006.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology: Risk Communication and Tactical Decision Making, Lockheed Martin Corporation, MD, 2006.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology: Sniper Case Study, SRA International for the Metropolitan Washington Council of Governments, Washington, DC, 2006.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology, Maryland State Highway Administration, MD, 2006.
- Ayyub, B. M., Critical Asset & Portfolio Risk Assessment (CAPRA) Methodology, CitiStat, Mayor’s Office, City of Baltimore, MD, September 14, 2006.
- Ayyub, B.M., and McGill, W.L., “The Critical Asset and Portfolio Risk Analysis Methodology for Critical Infrastructure Protection: Overview, Implementation, and Future Directions,” Annual Conference of the Society for Risk Analysis, Baltimore, MD, December 6, 2006.
- McGill, W.L., and Ayyub, B.M., “Quantitative Methods for Terrorism Warnings Analysis,” Annual Conference of the Society for Risk Analysis, Baltimore, MD, December 6, 2006.
- Ayyub, B.M., (invited speaker) “Risk Analysis for Informing Strategic and Tactical Decisions,” Naval War College, Chief of Naval Operations, Strategic Studies Group, Free Form Force, Newport, RI, October 26, 2006.
- McGill, W.L., and Ayyub, B.M., “Risk Analysis for Informing Resource-Allocation Decisions: Applications to Intelligence Community Problems,” Second Annual National Intelligence Conference and Exposition (INTELCON), North Bethesda, MD, May 7-9, 2006.
- McGill, W.L., and Ayyub, B.M., “Evidence-Theory Based Parameter Assessment for Homeland Security Risk Analysis,” Institute for Operations Research and the Management Sciences (INFORMS) Annual Conference, November 6, 2006, Pittsburgh, PA.
- McGill, W.L., and Ayyub, B.M., “Critical Asset & Portfolio Risk Analysis: Overview, Implementation, and Future Directions,” Institute for Operations Research and the Management Sciences (INFORMS) Annual Conference, November 6, 2006, Washington Plaza Hotel, Pittsburgh, PA.
- Ayyub, B.M., (invited panelist), “Risk Assessment,” FERC-DHS Dam Security and Emergency Preparedness Workshop, April 6-7, 2006, Washington Plaza Hotel, Washington, D.C.
- Ayyub, B.M., Quoted in Government Security News, <http://www.gsnmagazine.com/>, February 2006.
- Ayyub, B. M. (invited speaker), “Reliability of Civil Infrastructure, Measuring Risks, Different Views,” Transportation Research Board, a Session on Improving Reliability of Transportation Systems: From Concepts to Actions and the Role of Computation and Information, Sponsored by the Artificial Intelligence and Advance Computing Applications Committee (ABJ70), Washington, DC, January 22, 2006.
- Ayyub, B. M., Gupta, A., Assakkaf, I., Shah, N., Kotwicki, P., and Avrithi, K., “Development of Reliability-Based Load and Resistance Factor Design (LRFD) Methods for Piping,” Several Presentations to Committees during Codes Week, Birmingham, AL, February 28 and March 1, 2005.
- Ayyub, B. M., Reliability Analysis of Varistors and Deployable Generators, U. S. Air Force and Radian, Inc., Eglin Air Force Base, FL, January 10, 2005.
- Ayyub, B. M., “Risk-Informed Methods for Protecting Nuclear Facilities,” invited panelist on “Critical Asset Protection - Assessing the Nation's Nuclear Facilities” the American Nuclear Society topical meeting Operating Nuclear Facility Safety (2004 ONFS) in conjunction with the ANS Winter Meeting in Washington, DC, November 17, 2004.
- Ayyub, B. M., “Simulation-Based Assessment of the Probability of the Dynamic Capsizing of Naval Vessels,” Independent Review Team of Dynamic Stability of Innovative Designs of Naval Vessels, U. S. Navy, Naval Surface Warfare Center – Carderock Division, May 6, 2004.



- Ayyub, B. M., “Risk Analysis and Management for Critical Asset Protection,” Workshop, U. S. Department of Homeland Security, and ASME, Washington, DC, April 2004.
- Ayyub, B. M., “Risk-Based Optimal Maintenance Management of Ship Structures (ROMMSS),” U. S. Navy SBIR Forum, Hyatt Regency, Reston, VA, May 4, 2004.
- Ayyub, B. M., “Reliability-Based, Weight-Optimized Design of Primary Structural Components of Naval Vessels,” U. S. Navy SBIR Forum, Hyatt Regency, Reston, VA, May 3, 2004.
- Ayyub, B. M., Lead Speakers on Various Aspects of the Development of the “Guidance on Risk Analysis and Management for Critical Asset Protection,” U. S. Department of Homeland Security, ASME Workshop Asset Protection, April 14 to 16, 2004.
- Ayyub, B. M., “Portrayal of Information Uncertainty,” USAF, Wright-Patterson Air Force Base, 2/3/2004.
- Ayyub, B. M., “Consequences of Barge Operation in Locks with Deteriorated Walls,” U. S. Army Corps of Engineers, Waterways Experiment Station, January 21-23, 2004.
- Ayyub, B. M., “Risk-based Protection of Critical Assets,” U. S. Department of Homeland Security, and ASME, Washington, DC, December 2, 2003.
- Ayyub, B. M., “Expert Opinion Elicitation: Consequences of Barge Operation in Locks with Deteriorated Walls,” USACE, St. Louis District and Waterways Experiment Station, November 2003.
- Ayyub, B. M., “Consequences of Barge Operation in Locks with Deteriorated Walls,” U. S. Army Corps of Engineers, St. Louis District and Waterways Experiment Station, November 2003.
- Ayyub, B. M., and Kendrick, A., “The Effects of Fabrication Tolerances on the Fatigue Performance of Welded Details,” NAVSEA, U. S. Navy, Ship Structure Committee, SR-1428, October 2003.
- Ayyub, B. M., “Risk-based Protection of Critical Assets,” The Office of Domestic Preparedness of the U. S. Department of Justice, and ASME, Washington, DC, September 2003.
- Ayyub, B. M., “A Plan for Dynamic Loss-of-Stability Risk Assessment and Risk-based Design of Intact Naval Vessels,” NSWC-CD, U. S. Navy, Washington, DC, July 2003.
- Ayyub, B. M., “Risk-based Quality Assurance for Manufacturing Personal Flotation Devices,” Personal Flotation Devices Manufacturing Association (PFDMA), U. S. Coast Guard (Office of Boating Safety, Product Assurance Division) Report at 2003 PFDMA Annual Conference, June 2003.
- Ayyub, B. M., “A Risk-based Compliance Approval Models for Personal Flotation Devices,” Personal Flotation Devices Manufacturing Association (PFDMA), U. S. Coast Guard (Office of Boating Safety, Product Assurance Division) Report at 2003 PFDMA Annual Conference, June 2003.
- Ayyub, B. M., “A Risk-based Compliance Approval Models for Personal Flotation Devices,” NBSAC and U. S. Coast Guard Meeting, April 29, 2003.
- Ayyub, B. M., “Electric-Current Induced Drowning Accidents,” USCG, Washington, DC, May 2003.
- Ayyub, B. M., “Risk-Based Optimal Maintenance Management of Ship Structures,” Naval Sea System Command, U. S. Navy, May 2003.
- Ayyub, B. M., “Reliability-Based, Weight-Optimized Design of Primary Structural Components of Naval Vessels,” Naval Sea System Command, U. S. Navy, May 2003.
- Al-Fadhala, M. A., and Ayyub, B. M., “Uncertainty-Based Condition Assessment of Existing Structures,” the Third International Workshop on Life-Cycle Cost Analysis and Design of Civil Infrastructure Systems, Lausanne, 24-26, March 2003.
- Ayyub, B.M., Quoted in Professional Mariner Online, “In the aftermath of Prestige: Can industry spot problem tankers?” by David Tyler, Professional Mariner #70, February/March 2003, Navigator Publishing, 2003.
- Ayyub, B. M., “Risk-based Quality Assurance for Manufacturing Personal Flotation Devices,” U. S. Coast Guard, Underwriters Laboratories, Research Triangle Park, NC, December 13, 2002.
- Ayyub, B. M., “Risk-based Compliance Approval and Equivalency of Personal Flotation Devices,” U. S. Coast Guard, Underwriters Laboratories, Research Triangle Park, NC, December 13, 2002.

- Ayyub, B. M., “Failure Modes and Limit States for Class 2 and 3 Piping,” ASME Research Committee on Risk Technology, ASME Special Working Group on Probabilistic Methods in Design, Orlando, FL, December 11, 2002.
- Ayyub, B. M., “Reliability-Based Load and Resistance Factor Design Methods for Class 2 and 3 Piping,” ASME Research Committee on Risk Technology, ASME Special Working Group on Probabilistic Methods in Design, Orlando, FL, December 10, 2002.
- Ayyub, B. M., “Development of Reliability-Based Load and Resistance Factor Design Methods for Piping,” Invited by ASME Research Committee on Risk Technology, ASME Special Working Group on Probabilistic Methods in Design, Endorsed by ASME Codes Committee, Presented at the Office of Research, Nuclear Regulatory Commission, October 31, 2002.
- Ayyub, B. M., “Quality Assurance for Manufacturing Personal Flotation Devices,” Underwriters Laboratories, U. S. Coast Guard (Office of Boating Safety, Product Assurance Division), Expert Opinion Elicitation, August 2002.
- Ayyub, B. M., “Development of Risk-based Compliance Approval Models of PFDs,” Underwriters Laboratories, U. S. Coast Guard (Office of Boating Safety, Product Assurance Division), Expert Opinion Elicitation, August 2002.
- Ayyub, B. M., “Risk-Based Maintenance Management System for Ship Structure,” Naval Sea System Command, U. S. Navy, June 2002.
- Ayyub, B. M., “Development of Probabilistic Design Primary Loads for use in a Weight Optimized Structural Design of CVN(X),” Naval Sea System Command, U. S. Navy, June 2002.
- Ayyub, B. M., “Coastal Storm Damage Relationships Based on Expert Opinion Elicitation,” Institute for Water Resources, U.S. Army Corps of Engineers, June 2002.
- Ayyub, B. M., “A Risk-based Compliance Approval Process for PFDs: Beta Testing, Calibration, and Data Collection,” Personal Flotation Devices Manufacturing Association (PFDMA), U. S. Coast Guard (Office of Boating Safety, Product Assurance Division) Report at 2002 PFDMA Annual Conference, June 2002.
- Ayyub, B. M., “Quality Assurance for Manufacturing Personal Flotation Devices,” Personal Flotation Devices Manufacturing Association (PFDMA), U. S. Coast Guard (Office of Boating Safety, Product Assurance Division) Report at 2002 PFDMA Annual Conference, June 2002.
- Ayyub, B. M., “Development of Reliability-Based Load and Resistance Factor Design Methods for Piping,” ASME SWG Probabilistic Methods in Design (SG-D) (SCIII), ASME, May 2002.
- Ayyub, B. M., “Development of Reliability-Based Load and Resistance Factor Design Methods for Piping,” ASME Codes Committee and Research Committee on Risk Technology, ASME, May 2002.
- Ayyub, B. M., “Economic Consequence Assessment of Residential Flood Damage Expert-Opinion Elicitation,” Institute for Water Resources, U.S. Army Corps of Engineers, April 2002.
- Ayyub, B. M., “A Risk-based Compliance Approval Process for PFDs: Model Development,” Personal Flotation Devices Manufacturing Association (PFDMA), U. S. Coast Guard (Office of Boating Safety, Product Assurance Division) Report at 2001 PFDMA Annual Conference, June 2001.
- Ayyub, B. M., and Finkelstein, R., “Decide-Now Business Plan,” CyberCFO, VC Funding January 2001.
- Ayyub, B. M., and Finkelstein, R., “Decide-Now Business Plan,” VA Tech Expo, November 2000.
- Ayyub, B.M., “Hierarchical Ignorance Categories and Uncertainty Types in Engineering Systems,” Second International Workshop on Artificial Intelligence and Mathematical Methods in Pavement and Geomechanical Systems, organized by N. O. Attoh-Okine, University of Delaware, Newark, DE, August 2000.
- Mattei, N. J., and Ayyub, B.M., “Load and Resistance Factor Design (LRFD) Rules as Performance-Based Design Criteria for Surface Ships,” Shipbuilding Technologies 2000, September 21-22, 2000, Double Tree Hotel, New Orleans, LA.
- Ayyub, B.M., “Cost-Benefit Analysis of Risk-Informed Design of Structural Systems,” ASME Research Committee on Risk Technology, ASME, December 2000.
- Ayyub, B.M., “The Development of Risk-based Standards for Skate Parks and Other Active Recreational Activities Parks,” ASME Research Committee on Risk Technology, ASME, December 2000.

- Ayyub, B. M., "Cost-benefit Analysis of Risk-Informed Design of Piping Systems of Nuclear Plants," in the Risk-Informed Design Coordination Meeting, ASME Code Week, New Orleans, Sheraton Hotel, December 14, 1999.
- Ayyub, B.M., "The Development of Risk-Informed Qualification (RIQ) Guidelines of Active Mechanical Equipment," ASME Main Committee on the Qualification of Mechanical Equipment, ASME, May 1999.
- Ayyub, B.M., "Risk-Informed Qualification (RIQ) Guidelines of Active Mechanical Equipment," ASME Research Committee on Risk Technology, ASME, May 1999.
- Ayyub, B.M., "Simulation Methods for Structural Reliability Assessment," the First TSS/ASTA International Conference on Technology Parks and Transfer of Knowledge, the Arab Scientists and Technologists Abroad (ASTS), Tunis, funded by the United Nations Education, Scientific and Cultural Organization (UNESCO) among others, through the University of Illinois at Urbana-Champaign, IL, July 1996.
- Ayyub, B.M., "Systems Reliability Analysis of Navigation Locks," the First TSS/ASTA International Conference on Technology Parks and Transfer of Knowledge, the Arab Scientists and Technologists Abroad (ASTS), Tunis, funded by the United Nations Education, Scientific and Cultural Organization (UNESCO) among others, through the University of Illinois at Urbana-Champaign, IL, July 1996.
- Ayyub, B.M., "Marine Applications of Risk-based Technologies," ASME Workshop on Risk-based Applications for U.S. Coast Guard Operations, December 12-13, 1995, Tysons Corner, VA.
- Ayyub, B.M., Advances in Structural Reliability, the USACE Structural Engineering Conference, invited speaker, August 28 - September 1, 1995.
- Ayyub, B.M., "Risk-Based Inspection," the Second Congress of Arab Scientists and Technologists Abroad (ASTS), Amman, Jordan, funded by the National Science Foundation (NSF) and the United Nations Education, Scientific and Cultural Organization (UNESCO) among others, through the University of Illinois at Urbana-Champaign, IL, July 30 to August 5, 1994.
- Dahiyat, E., Hassoun, G., Ayyub, B.M., Aissi, C., Shawar, S., and El-Ekabi, H., A Panel on "Brain Drain," the First Congress of Arab Scientists and Technologists Abroad (ASTS), Amman, Jordan, funded by the National Science Foundation (NSF) and the United Nations Education, Scientific and Cultural Organization (UNESCO) among others, through the University of Illinois at Urbana-Champaign, IL, August 17-19, 1992.
- Ayyub, B.M., and Lai, K.-L., "Structural Reliability Assessment with Ambiguity and Vagueness in Failure," ASNE Day, May 1, 1992, Washington, DC
- Hassan, M.H.M., and Ayyub, B.M., "A Model for Real-Time Control of Construction Activities Using Personal Computers," American Concrete Institute Annual Convention, March 8, 1992, Washington, DC
- Ligomenides, P., Ayyub, B.M., Zimmermann, H.J., and Vamos, T., A Panel on "Management of Uncertainty: Cases, Models and Machines," The First International Symposium on Uncertainty Modeling and Analysis, University of Maryland, College Park, MD, December 3-5, 1990.
- Ayyub, B. M., White, G. J., Bell-Wright, T. F., and Purcell, E. S., "Comparative Structural Life Assessment of Patrol Boat Bottom Plating," ASNE Day, May 2-4, 1990.
- Ayyub, B. M., Ibrahim, A., and Pressualla, H., "Post-Tensioned Steel Bridges," Poster Session, 1989 National Steel Construction Conference, AISC, Nashville, Tennessee, June 21-24, 1989.
- Ayyub, B. M., "Structural Life Expectancy of Ships," Society of Reliability Engineers meeting, ORI, Inc., Crystal City, VA, May 11, 1989.
- Ayyub, B.M., White, G.J., and Purcell, E.S., "Estimation of the Structural Service Life of Boats," ASNE Day, May 1989.
- Ayyub, B.M., "Risk-Based Decision Making in Bridges, Marine Structures and Construction," Panel Presentation, ASME Third Annual Forum on Risk Analysis, Chicago, December 1988.
- Schelling, D.R., Albrecht, P., and Ayyub, B.M., "Heavy Truck Limits on the National Bridge Inventory," Afternoon Session A: Design, Construction and Evaluation, International Bridge Conference, Engineers' Society of Western Pennsylvania, Pittsburgh, Pennsylvania, June 23, 1987
- White, G.J., and Ayyub, B.M., "Reliability-Based Fatigue Design for Ship Structures," SNAME, ASNE Day, May 1987.

- Schelling, D.R., Albrecht, P., and Ayyub, B.M., "Evaluation of Bridge Structures Subjected to Heavy Loads," Transportation Research Board 66th Annual Meeting, National Research Council, Washington, DC, January 1987.
- Saadatmanesh, H., Albrecht, P., and Ayyub, B.M., "Behavior of Prestressed Composite Steel-Concrete Beams," American Concrete Institute Annual Convention, Baltimore, Maryland, November 11, 1986.
- Ayyub, B.M., and Kadissi, R., "Conditional Failure and Survival Probability Distributions in Structural Engineering," Chesapeake Bay-Delaware Probability Statistics Day, Department of Mathematics, University of Maryland, Baltimore County, December 1986.
- Ayyub, B.M., and White, G.J., "A Reliability-Conditioned Approach for Calibrating Structural Codes," The Fifth ASCE Structures Congress, New Orleans, Louisiana, 15-18 September, 1986.
- Saadatmanesh, H., Albrecht, P., and Ayyub, B.M., "Analytical and Experimental Study of Prestressed Steel Composite Girders," the Fifth ASCE Structures Congress, New Orleans, Louisiana, 15-18 September 1986.
- Ayyub, B. M., Applications of Fuzzy Sets, The National Science Foundation Workshop on Civil Engineering Applications of Fuzzy Sets, October 17-19, 1985, Purdue University, West Lafayette, Indiana.
- White, G.J., and Ayyub, B.M., "Reliability Methods for Ship Structures," SNAME, ASNE Day, May 1985.
- Haldar, A., and Ayyub, B.M., "Probabilistic Lateral Loading in Pressure Vessel Design," Symposium on Advances in Probabilistic Structural Mechanics, Pressure Vessels and Piping Conference, ASME, Orlando, Florida, June 1982.

### **Presentations: Invited Lectures and Short Courses**

This section lists a representative set of lectures and short courses to show their types and scope.

- Numerous invited talks and seminar not listed on infrastructure resilience, sea level rise, risk methods, engineering adaptation to a changing climate, and quantitative finance for risk management.
- Ayyub, B. M., 2021, "Hazard-Resilient Infrastructure," Keynote Presentation, May 24, 2021, ASCE Infrastructure Resilience Division, ASCE, Reston.
- Ayyub, B. M., 2019, "Climate-Resilient Infrastructure: Technical and Economic Challenges," Invited Presentation, October 29, 2019, Northern Virginia Regional Commission, Fairfax, VA, USA.
- Ayyub, B. M., 2019, "System Resilience: Definitions, Quantification and Associated Economics," Invited Keynote ASME 2019 International Mechanical Engineering Congress & Exposition (IMECE2019), SERAD, November 13, 2019, Salt Lake City, USA.
- Ayyub, B. M., 2019. "Climate-Resilient Infrastructure: Adaptive Design and Risk Management," Webinar, Committee on Adaptation to a Changing Climate, ASCE, Reston, VA.
- Ayyub, B. M., 2018. "Disaster Resilience of Infrastructure Systems: Quantification and Economic Valuation for Decision and Policy Making," Webinar, Infrastructure Resilience Division, ASCE, Reston, VA.
- Ayyub, B. M., 2018. "Climate-Resilient Infrastructure," Webinar, Committee on Adaptation to a Changing Climate, ASCE, Reston, VA.
- Invited lecture by the University of Illinois at Urbana-Champaign to the Sustainable and Resilient Infrastructure Systems Seminar on "Resilience Measurement and Metrics for Decision and Policy Making," April 20, 2017.
- Ayyub, B. M., (invited speaker) "Global Catastrophic Risks with Climate Change as a Case Study," Tongji University, March 11-17, 2016, Shanghai, China.
- Ayyub, B. M., (invited speaker) "Practical Resilience Metrics for Critical Infrastructure," Tongji University, March 11-17, 2016, Shanghai, China.
- Ayyub, B. M., (invited speaker) "Systems Resilience for Multi-Hazard Environments: Definition, Metrics and Valuation for Decision Making," National Institute of Standards and Technology, Engineering Laboratory, December 19, 2012.
- Ayyub, B. M., (invited speaker) "Uncertainty and Risk Analysis Methods," Defense Threat Reduction Agency, Advanced Systems and Concepts Office, October 26, 2010.

- Ayyub, B. M., Banquet Speaker, “Risk Analysis for Multi-Hazards,” SERAD, 2009 ASME International Mechanical Engineering Congress & Exposition, Orlando, FL, November 18, 2009.
- Ayyub, B. M., (invited speaker) “Memetics: Establishing a Quantitative Foundation,” Defense Advanced Research Projects Agency (DARPA) Workshop, April 4-6, 2006.
- Ayyub, B.M., (invited panelist), “Risk Assessment,” FERC-DHS Dam Security and Emergency Preparedness Workshop, April 6-7, 2006, Washington Plaza Hotel, Washington, D.C.
- Ayyub, B.M., (invited speaker) “Risk Analysis for Informing Strategic and Tactical Decisions,” Naval War College, Chief of Naval Operations, Strategic Studies Group, Free Form Force, Newport, RI, October 26, 2006.
- Ayyub, B. M., (invited participant) “Uncertainty Analysis, and Efficient Networked Systems,” Critical Infrastructure Protection R&D Workshop for Academic and Federal Lab R&D Providers, U.S. Department of Homeland Security, Washington, DC, June 2005.
- Ayyub, B. M., (invited Keynote Lecture by the University of Glasgow and the University of Strathclyde) "Ignorance Analysis for Discovery and Knowledge Construction," 2nd International ASRANET Colloquium, the Network for Integrating Structural Safety, Risk and Reliability, July 5-7, 2004, Barcelona, Spain.
- Ayyub, B. M., (invited Distinguished Lecture by the Brazilian Research Agency) "Risk-informed Inspection of Industrial Equipment," 17th International Congress of Mechanical Engineering, COBEM2003, São Paulo, Brazil, November 2003, 10 pages.
- A 3-day short course on "Reliability Methods for Marine Systems," given to engineers and researchers from the Carderock Division of the Naval Surface Warfare Center and the Naval Sea Systems Command, US Navy, Spring 1997.
- A 12-lecture short course on "Reliability Methods for Ship Structures," given to engineers and researchers from the Naval Sea Systems Command, US Navy, Spring 1995.
- A 12-lecture short course on "Reliability Methods for Ship Structures," given to engineers and researchers from the Carderock Division of the Naval Surface Warfare Center, US Navy, Winter 1995.
- A 16-lecture short course on "Reliability Methods for Ship Structures," given to engineers and researchers from the Naval Sea Systems Command, US Navy, Spring 1994.
- A Review Short Course on the "Principles and Practices of Engineering - Structural Engineering," with D. Suess, The Office of Continuing Education, The University of Maryland, Baltimore County Campus, August 17 - October 14, 1992.
- A Two-day short course on "Reliability of Structural Components and Systems," with M.H.M Hassan, Maryland Instructional Television and the National Technological University, College Park, MD, July 21 and 22, 1992.
- A Two-week short course on structural reliability, Southwestern Jiaotong University, Departments of Applied Mechanics and Civil Engineering, Emei, People's Republic of China, June 10-24, 1985.

### Interviews and Media Coverage

Dr. Ayyub was interviewed and had media coverage on many occasions; however, they are not tracked and documented. The following list provides examples:

- ASCE News 2019: <https://news.asce.org/at-the-crossroads-of-civil-engineering-and-climate-change/>
- E&E News 2019: <https://www.eenews.net/stories/1060850731>
- Engineering 2019: <http://www.engineering.org.cn/en/10.1016/j.eng.2019.07.009>
- Speaker, The National Academies Seminar 2018: <https://vimeo.com/259343422>
- Engineering News-Record 2018: <https://www.enr.com/articles/45718-asce-publishes-manual-on-designing-climate-resilient-infrastructure>
- Texas Climate News 2018: U.S. government needs to do more to climate-proof communities, say experts, <http://texasclimateneeds.org/?p=14771>
- Thomson Reuters Foundation News 2018: U.S. government needs to do more to climate-proof communities, say experts, <https://news.trust.org/item/20180309144012-e68p9/>
- Engineering News-Record 2017 Top 25 Newsmakers: <https://www.enr.com/top-25-newsmakers-2017>
- Fox 5 on a deeper look into the levee system on the National Mall 2017: <https://www.fox5dc.com/news/a-deeper-look-into-the-levee-system-on-the-national-mall>
- ASCE Meet the Editor 2016: <https://ascelibrary.org/page/ajrua6/editorjru>

- NAE Engineering Innovation Podcast and Radio Series 2013: <https://www.nae.edu/68997/DC-Deluge>
- ASME, Workshop on Analyzing Risks of Extreme Storms and Temperatures Due to a Changing Climate: Impacts and Adaptation for Washington Metropolitan Area, 2013: <https://www.asme.org/topics-resources/society-news/asm-news/risk-symposium-report-now-available>
- WAMU Metro Connection (2009): <http://wamu.org/programs/mc/09/08/14.php>
- Washington Post, 2012: [https://www.washingtonpost.com/local/trafficandcommuting/worst-case-scenario/2012/11/03/3cb1360e-260f-11e2-9313-3c7f59038d93\\_graphic.html](https://www.washingtonpost.com/local/trafficandcommuting/worst-case-scenario/2012/11/03/3cb1360e-260f-11e2-9313-3c7f59038d93_graphic.html)

### Research Projects: Funded at the University of Maryland

PI = Principal Investigator, Co-PI = Co-Principal Investigator, and I = Investigator

Note: Funding amounts are provided only for recent projects and proposal submissions.

### Ongoing or recently completed projects (funding levels provided for recent/ongoing projects)

<u>Title and Duration</u>	<u>Investigators and Positions</u>	<u>Sponsors</u>
<ul style="list-style-type: none"> <li>• Climate Resilience in Engineering Practice for Infrastructure, 2021-2023, \$153,820+\$49,998 = \$203,818</li> </ul>	B. Ayyub (PI)	NOAA
<ul style="list-style-type: none"> <li>• Ocean Energy Safety Institute 2.0, 2021-2026, up to \$40,000,000 task order (<a href="#">awarded</a>), UMD Share TBD (Executive role funded at \$148,000)</li> </ul>	B. Ayyub (co-PI) TAMU Lead	DOE and DOI
<ul style="list-style-type: none"> <li>• Quantifying the Resilience of Freight Railroad Networks, 2020-2022, \$409,957</li> </ul>	B. Ayyub (PI)	Federal Railroad Administration
<ul style="list-style-type: none"> <li>• Hurricane Maria Investigation: Resilience of Supply-Chain Infrastructure Networks, 2018-2022, \$200,000/year</li> </ul>	B. Ayyub (PI)	National Institute of Standards and Technology
<ul style="list-style-type: none"> <li>• Maritime Situational Awareness and Response Support (MSARS), University of Alaska-Fairbanks (lead, ~\$1m) 2014-2019, \$2,717,687 (UMD share TBD 2015)</li> </ul>	B. Ayyub (UMD PI)	Department of Homeland Security
<ul style="list-style-type: none"> <li>• Global Catastrophic Risks, funded directly sabbatical leave \$280,000 (2014-15)</li> </ul>	B. Ayyub (PI)	National Security Analysis Department, Applied Physics Laboratory, The Johns Hopkins University
<ul style="list-style-type: none"> <li>• Sustainable Construction and Manufacturing, 2013-2015, \$300,000</li> </ul>	B. Ayyub (PI)	National Institute of Standards and Technology
<ul style="list-style-type: none"> <li>• Autonomous Robots, 2012-13</li> </ul>	B. Ayyub (PI)	Robotic Technology, Inc.
<ul style="list-style-type: none"> <li>• Project Risk Analysis and Management, 2011-12</li> </ul>	B. Ayyub (PI)	Hyundai Heavy Industries Company Limited
<ul style="list-style-type: none"> <li>• A Risk-Based Framework for Rail Security, 2009-11</li> </ul>	B. Ayyub (PI)	Maryland Emergency Management Agency and the City of Baltimore
<ul style="list-style-type: none"> <li>• Anatomizing the Behavior of Radiological and Nuclear Non-State Adversaries, 2008-09</li> </ul>	B. Ayyub (I)	DHS, START Center

- Energetically Autonomous Tactical Robot (EATR), 2008-09 B. Ayyub (PI) Robotic Technology, Inc.
- Gift to Support Risk Studies, 2007-09 B. Ayyub (PI) Kuwait Institute for Scientific Research
- A Risk-Based Framework for the Protection of Critical Infrastructure and Key Assets, 2007-08 B. Ayyub (PI) Maryland Emergency Management Agency and the City of Baltimore
- Exhibit space and promotional support (Gift) B. Ayyub (PI) E. J. Krause, Rockville, MD
- A Risk-Based Framework for the Protection of Critical Infrastructure and Key Assets, 2005-07 B. Ayyub (PI) Maryland Emergency Management Agency
- Risk analysis for homeland Security Studies, 2005 B. Ayyub (PI) Corporations - Analytic Services, Inc.
- DHS Center of Excellence on Behavioral and Social Aspects of Terrorism and Counter-Terrorism, 2005-09 G. LaFree (PI), B. Ayyub, and others Department of Homeland Security
- Homeland Security Studies, 2004-05 B. Ayyub (PI) Corporations - Analytic Services, Inc.
- Homeland Security Studies, 2004-05 B. Ayyub (PI) Corporations - Analytic Services, Inc.
- MOA University of Maryland/National Institute of Standard, 2003-08 B. Ayyub (PI) COMM – NIST
- Memorandum of Agreement Between UM and NSWC US Navy, 2001-06 B. Ayyub (PI) DOD – Navy, NSWC
- Intelligent Driving, 2004 B. Ayyub (PI) and Ibrahim Assakkaf (Co-PI) Fredrick Auto Center, Maryland
- Safety and Risk Studies, 2004 B. Ayyub (PI) American Boat and Yacht Council
- Three HMMWV's and Support for Developing a Platform of Autonomous, Intelligent, Collaborative HMMWV's, Equipment Donated in 2003 B. Ayyub (PI) AM General
- Early Detection of Reliability Concerns, 2002-03 B. Ayyub (Co-PI) and M. Kaminskiy (Co-PI) Ford Motor Company
- Ignorance Analysis for Discovery and Knowledge Construction: Problem Definition for Developing a Methodology, 2002-03 B. Ayyub (PI) Air Force Office of Scientific Research
- Load and Resistance Factor Design (LRFD) Rules as Performance-Based Design Criteria for Surface Ships, 1999-02 B. Ayyub (PI) and I. Assakkaf Gulf Coast Research Maritime Technology Center, University of New Orleans
- Risk Analysis of Marine Systems, 2000-01 B. Ayyub (PI) ASEE Fellowship, ONR and CDNSWC, U.S. Navy



- Hosting and Support of the Web-based Reliability Software WSTAR, 1999-00 B. Ayyub (PI) U. S. Army Corps of Engineers
- Development of Risk-based Constructability Guidelines for the Mobile Offshore Base, 1998-00 B. Ayyub (PI) Office of Naval Research, U. S. Navy
- Java and JDBC Programming: Training Course, 1999 B. Ayyub (PI) and C. Popescu Net Consultants
- Risk Analysis of Marine Systems, 1998-1999 B. Ayyub (PI) InfoTech, Inc. for CDNSWC, U.S. Navy
- Development of Reliability Curves for Ice-making Machines, 1997 B. Ayyub (PI) and K. Atua Scotsman Ice, Inc.
- Risk-based Analysis of Low Speed Diesel Systems for the Engine Room Arrangement Model, 1997-98 B. Ayyub (PI) Vector Research, Inc. for CDNSWC, U.S. Navy
- LRFD Rules for Ship Structures, 1997-98 B. Ayyub (PI) CDNSWC, U.S. Navy
- Reliability Analysis & Assessment of Hydropower Equipment, 1997-98 B. Ayyub (PI) U.S. Department of Agriculture, and U.S. Army Corps of Engineers (Institute for Water Resources)
- Development of Engineered Marine System Assessment (EMSA) Methodology, 1996-97 B. Ayyub (PI) National Maritime Center of the U.S. Coast Guard
- Reliability Analysis & Assessment of Hydropower Equipment, 1995-96 B. Ayyub (PI) U.S. Department of Agriculture, and U.S. Army Corps of Engineers (Institute for Water Resources)
- Data Collection Strategies for Reliability Analysis, 1994-95 B. Ayyub (PI) U.S. Army Engineer Waterways, Vicksburg, MS
- Reliability Assessment of Hull Girder Bending of Naval Vessels, 1994-95 B. Ayyub (PI) CDNSWC, U.S. Navy
- Structural Reliability Assessment Using Finite Element Analysis with Vaguely Defined Failures, 1994-95 B. Ayyub (PI) CDNSWC, U.S. Navy
- Reliability-Based Design of Ship Structures, 1993-94 B. Ayyub (PI) ASEE Fellowship, ONR and CDNSWC, U.S. Navy
- The Second International Symposium on Uncertainty Modeling and Analysis - ISUMA'93, 1992-93 B. Ayyub (PI) National Science Foundation
- Peace Fellowship for Mr. Samir L. Kamel, 1991-1992 B. Ayyub (PI) and N. Kartam (I) Agency for International Development through the Embassy of Egypt to the USA
- Structural Testing Program for Weld Strength, Industrial Quality, Inc., Gaithersburg, Maryland, 1991 B. Ayyub (PI) Technology Extension Service, Engineering Research Center, University of Maryland
- Integrated Control Structure for Construction, 1990-992 B. Ayyub (PI) National Science Foundation through North Carolina (NC) State University.

- Structural Reliability Assessment of Ships with Imprecision and Ambiguity in Failures, 1990-92 B. Ayyub (PI) David Taylor Research Center, U.S. Navy
- Senior Mentor for a Lilly Teaching Fellow, 1990-91 academic year B. Ayyub (Mentor) Office of the Dean for Undergraduate Studies, University of Maryland
- Corrosion of Stainless-Steel Welded Mesh as Structural Reinforcement, Baltimore Specialty Steel Corporation, Baltimore, Maryland, 1990 B. Ayyub (PI) Technology Extension Service, Engineering Research Center, University of Maryland
- Structural Reliability Assessment Based on Fuzzy Definition of Failure, 1990 B. Ayyub (PI) General Research Board, University of Maryland
- Failures During Construction in the Reinforced Concrete Industry, Industrial Quality, Inc., Gaithersburg, Maryland, 1989 B. Ayyub (PI) Technology Extension Service, Engineering Research Center, University of Maryland
- Upgrading a Universal Testing Machine, Equipment Grant, 1989-90 A. Wolde-Tinsae (PI), B. Ayyub (Co-PI) and J. Colville (Co-PI) National Science Foundation
- The First International Symposium on Uncertainty Modeling and Analysis, 1989-90 B. Ayyub (PI) Engineering Research Center, University of Maryland
- Risk-Based Inspection Guidelines for Industrial Facilities, 1989-1991 B. Ayyub (PI) ASME and Nuclear Regulatory Commission
- The First International Symposium on Uncertainty Modeling and Analysis, 1989-90 B. Ayyub (PI) National Science Foundation
- Enhancement of the Truss Rating and Analysis Program (TRAP), 1986-88 D. Schelling (PI) and B. Ayyub (I) Maryland State Highway Administration
- Weigh-In-Motion Analysis of Trucks, 1987-89 D. Schelling (PI) and B. Ayyub (I) Maryland State Highway Administration
- Structural Behavior of Prestressed Composite Steel Beams with Coated Strands, 1986-87 B. Ayyub (PI) Florida Wire and Cable Company
- Bridge Rehabilitation and Geotechnical Explosives Testing, 1986-87 Equipment Grant B. Ayyub (PI) and D. Goodings (Co-PI) Department of Defense
- Use of Welded Steel Mesh in Reinforced Concrete Bridge Decks, 1986-89 P. Chang (PI), B. Ayyub (Co-PI) and L. Bernold (I) Maryland State Highway Administration
- Fatigue of Prestressed Structural Steel, 1986-87 P. Albrecht (PI) and B. Ayyub (Co-PI) National Science Foundation

- Detection of Delaminations and Cavities in Concrete, A State-of-the-Art Study, 1985-86 B. Ayyub (PI) Maryland State Highway Administration
- Static Strength of Prestressed Composite Steel Girders, 1985-87 B. Ayyub (PI) and P. Albrecht (Co-PI) National Science Foundation
- An Assessment of the Load Potential for the Passage of Various Truck Configurations on Representative Bridge Structures, 10/85 to 11/86 D. Schelling (PI), B. Ayyub (Co-PI), L. Bridwell (I), P. Albrecht (I) and T. Corsi (I) American Trucking Association
- Reliability-Conditioned Design Criteria, 5/85 to 4/86 B. Ayyub (PI) Minta Martin Aeronautic Research Fund, University of Maryland
- An Improved Simulation Technique as a Structural Reliability Model, 7/84 to 5/85 B. Ayyub (PI) Minta Martin Aeronautic Research Fund, University of Maryland
- A Practical Reliability Model for Correlated Random Variables, 6/84 to 9/84 B. Ayyub (PI) General Research Board, University of Maryland

**Proposals recently submitted (Illustrative of Interests and Trends)**

- Hazard Identification, Risk Assessment and Impact Analysis for Infrastructure and Community Resilience (HIRAICR) of the State of Kuwait, 2021-2023, \$200,000 (pending) B. Ayyub (PI) S. Al-Sanad (KISR Lead) Kuwait Institute for Scientific Research
- Blockchain-enabled Auditable and Secure Framework for Safe and Efficient Railroad Management and Rolling Stock Operation, 2021-2023, \$500,000 (pending) B. Ayyub (PI) Federal Railroad Administration
- Blockchain-based Energy-efficient and Autonomous Management of Urban Air Mobility, 2021-2023, \$1,000,000 (pending) B. Ayyub (PI) DOE ARPA-E
- Community Resilience Program, 2018-2023, \$9,700,000 B. Ayyub (PI) National Institute of Standards and Technology (with Abt Associates, Inc. as the prime)
- Risks of and Regulations of Transporting Hazardous Materials Using Unmanned Autonomous Vehicles, 2018-2020, \$647,623 B. Ayyub (PI) Department of Transportation
- Center for Disaster Resilience, Science and Technology Center, 2019-2024, about \$20,000,000 J. Torero (PI), B. Ayyub and others (co-PI) National Science Foundation

- Assessing the Risk of Transporting Natural Gas Hydrates for Informing Regulations, 2018-2020, about \$450,000 B. Ayyub (PI) and D. Walker (co-PI) Department of Transportation
- CRISP 2.0 Type 1: Collaborative Research: A generic, extensible, and quantitative framework for understanding and improving the resilience of critical infrastructure systems, 2018-2021, \$308,261+\$441,679 B. Ayyub (PI), and S. Duan, J. Short and J. Wang (co-PIs) National Science Foundation
- Quantifying the Effects of Environmental Nonstationarity at DoD Relevant Scales, 2017-2020, \$200,000 B. Ayyub (PI) Strategic Environmental Research and Development Program, Department of Defense (DoD)
- Climate Resilience of Critical Infrastructure to Extreme Precipitation B. Ayyub (PI) National Science Foundation
- Using Non-Stationary Processes with Internal Dependency, 2017-2020, \$632,919
- Cost Engineering for Earthquake Resilient Government Buildings, 2016-2018, about \$900,000 B. Ayyub (PI) National Institute of Standards and Technology
- CRISP Type 2: Compositional Behavior Modeling and Control of Large-Scale Resilient Interdependent Urban Infrastructures, 2017-2019, \$2,495,983 M. Austin (PI) J. Baras, B. Ayyub, W. Cleaveland and K. Wood (co-PIs) National Science Foundation
- CASCADE for Coupled Multi-City Resilience under Multi-Hazards, 2016-2020, \$4,270,731 M. Austin (PI) B. Ayyub, J. Baras and W. Cleaveland (co-PIs) Defense Advanced Research Projects Agency
- Center of Excellence on Community Resilience, VA Tech (Lead ~\$20m), 2015-2019 B. Ayyub (PI) National Institute of Standards and Technology

### Research Projects: Advisory and Consulting Activities

This section lists selected other funded projects and consulting activities.

- Vineyard Wind, Barge Transport and Hurricane Barriers Risk, 2020-21.
- USCG – Life Expectancy Analysis of the National Security Cutter, 2014-21.
- Kuwait Institute for Scientific Research – Infrastructure Reliability and Asset Management, 2012-14.
- NIST – Economics of Community Disaster Resilience, 2014-15.
- CSC and US Navy – Construction Quality Control of Wave Tank Test Facility, 2012-13.
- Bechtel – Risk Studies on LNG Facilities in Australia, 2009-12.
- U. S. Coast Guard – Ship Structural Life Assessment, 2009-11.
- Naval Sea System Command, the U.S. Navy – Ship Stability and Capsizing, 2006-10.

- Boating Safety Council and U.S. Coast Guard, Washington, DC – Personal Flotation Devices, 2006-10.
- USACE, development of risk analysis models of the levees and floodwalls that overtopped or breached during Hurricane Katrina in order to provide answers for use in future New Orleans protection project designs to support the federal government's Interagency Performance Evaluation Taskforce (IPET), 2005-07.
- FDA, Risk Analysis of Transdermal Drug Delivery Systems, Food and Drug Administration, Center for Drug Evaluation and Research, Office of Pharmaceutical Science, Rockville, MD, 2005-06.
- U. S. Air Force and the Office of the Secretary of Defense – Information Uncertainty Portrayal – Phase I, 2004.
- U.S. Department of Homeland Security and ASME – Risk-based Protection of Critical Assets, 2003-04.
- U.S. Army Corps of Engineers and RSMMeans, Inc. – Development of Predictive Model for Flood Damage to Roads, 2003-04.
- U.S. Army Corps of Engineers – Expert Opinion Elicitation of Consequences Related to Barge Operation in Locks with Deteriorated Walls, 2003-04.
- Boating Safety Council and U.S. Coast Guard, Washington, DC – Accident Analysis of Power Watercraft, 2003-04.
- Boating Safety Council and U.S. Coast Guard, Washington, DC – Electric Current Induced Drowning, 2003-04.
- Naval Sea System Command, the U.S. Navy – Risk-Based Inspection of Ship Structures – Phase II, 2002.
- Naval Sea System Command, the U.S. Navy – Assessment of Loads for the Reliability-based Design and Weight Reduction of Aircraft Carriers – Phase II, 2002.
- U.S. Army Corps of Engineers – Uncertainty Assessment of Flood Consequences for Residential Structures and Contents, 2002.
- Ship Structures Committee, and U.S. Coast Guard, Washington, DC – Effect of Fabrication Tolerances on Fatigue Performance of Ship Structures, 2002.
- U.S. Coast Guard – Risk-based Quality Assurance During Manufacturing of Personal Flotation Devices, 2002.
- U.S. Coast Guard – Risk-based Compliance Approval Models of Personal Flotation Devices, 2002.
- Boating Safety Council and U.S. Coast Guard, Washington, DC – Electric Current Induced Drowning, 2002-03.
- Ship Structures Committee, and U.S. Coast Guard, Washington, DC – Risk-based Inspection of Ship Structures, 2001-02.
- U.S. Army Corps of Engineers – Assessment of Flood Consequences for Residential Structures and Contents for Coastal Areas, 2002.
- U.S. Army Corps of Engineers – Assessment of Flood Consequences for Residential Structures and Contents, 2000-02.
- U.S. Army Corps of Engineers – Expert Opinion Elicitation of Failure Probabilities and Consequences, 2000-01.
- U.S. Army Corps of Engineers – Hazard Function Assessment of Systems, 2001.
- U.S. Army Corps of Engineers – Assessment of Flood Damage of Residential Structure and Contents, 2001.
- Naval Sea System Command, the U.S. Navy – Risk-Based Inspection of Ship Structures, 2001.
- Naval Sea System Command, the U.S. Navy – Design and Fabrication Guidelines of Doubler Plates for Ship Structures, 2001.
- Naval Sea System Command, the U.S. Navy – Assessment of Loads for the Reliability-based Design and Weight Reduction of Aircraft Carriers, 2001.
- Carderock Division of the Naval Surface Warfare Center, the U.S. Navy, Carderock, MD - Reliability-Based Design (LRFD) Rules of Ship Structures, 2001.
- War Room Research, Inc. – Decide-Now Tools for Selecting a Network Solution, Software License, 2001.

- Nortel Networks Corporation – Decide-Now Tools for Selecting a Network Solution, Software License, 2001.
- Carderock Division of the Naval Surface Warfare Center, the U.S. Navy, Carderock, MD - Calibration of Reliability-Based Design (LRFD) Rules of Ship Structures, 2000.
- U.S. Army Corps of Engineers – Risk Methods for the Assessment of Dam Safety, 1999-00.
- National Research Council of Canada, Martec Limited, Halifax, Nova Scotia - Fuzzy Finite Element Methodology for Imprecise Complex Structures, 1999-01.
- NCHRP 24-17, Transportation Research Board, National Research Council, Washington, DC – LRFD Deep Foundation Design, 1999-00.
- ASME – Cost-Benefit Analysis of Risk-Informed Design of Structural Systems, 1999.
- Midas, Inc., and U.S. Navy, Washington, DC – Hazard Analysis of Cargo Handling and Stowage Onboard Ships, 1999-00.
- Ship Structures Committee, and U.S. Coast Guard, Washington, DC - Risk Based Life Cycle Management of Ship Structures, 1999-00.
- Ship Structures Committee, and U.S. Coast Guard, Washington, DC - Supplemental Design Guide for Blast, 1999-00.
- Ship Structures Committee, and U.S. Coast Guard, Washington, DC – Life Expectancy Assessment of Ship Structures, 1999-00.
- U.S. Coast Guard – Risk-based Compliance Approval Process of Personal Flotation Devices, 1999.
- U.S. Coast Guard and ASME – Risk-based Compliance of Personal Flotation Devices, 1997-1998.
- U.S. Army Corps of Engineers – Risk-based Guidelines for the Assessment of Dam Safety, 1996-1997.
- Naval Sea System Command, U.S. Navy, Crystal City, VA – Sampling for Reliability Assessment of Inflation Devices Used in Life Rafts, 1996-97.
- ASME – Fault Tree Handbook, 1997.
- U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS - Reliability of Pile Groups, 1996-1997.
- Carderock Division of the Naval Surface Warfare Center, the U.S. Navy, Carderock, MD - Development of Reliability-Based Design (LRFD) Rules of Ship Structures, 1994-99.
- U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS - Reliability and Stability Assessment of Concrete Gravity Structures, 1995-96.
- Naval Sea System Command, U.S. Navy, Crystal City, VA - Reliability of Inflation Devices Used in Life Rafts, 1994-95.
- U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS - Loading Cycles for the Fatigue Reliability Analysis of Miter Gates on the Upper Mississippi and Ohio Rivers, 1994-95.
- Ship Structures Committee, National Research Council, and U.S. Coast Guard, Washington, DC - Probability-Based Design of Marine Structures - Phase III, 1994-95.
- Civil Engineering Research Foundation, ASCE, Washington, DC - Reliability Applications in Civil Works for the US Army Corps of Engineers, 1994.
- International Monetary Fund (IMF), Washington, DC - Reliability of Critical Building Systems of Phase III of the IMF Headquarters, 1993.
- Naval Sea System Command, U.S. Navy, Crystal City, VA - Fault Tree Analysis of Cargo Elevators Onboard Ships, 1992.
- U.S. Coast Guard, Groton, CT - A Plan for the Evaluation of Alternative Vessel-Tank Visual Inspection Practices, 1992.
- Ship Structures Committee, National Research Council, and U.S. Coast Guard, Washington, DC - Uncertainty in Strength Measures of Marine Structures, 1992-93.
- Naval Sea System Command, U.S. Navy, Crystal City, VA - Experimental Design and Evaluation of Emergency Escape Breathing Devices Onboard Ships, 1992-94.
- U.S. Naval Academy, Annapolis, MD, and U.S. Coast Guard, Oil Pollution Act 1990 - Probabilistic Corrosion Rate of Steel Structures, 1991.
- Ship Structures Committee, National Research Council, and U.S. Coast Guard (SBIR), Washington, DC - Reliability-Based Design of Ship Structures, 1992.

- Naval Sea System Command, U.S. Navy, Crystal City, VA - Statistical and Reliability Analyses of Welds in Submarine Structures, and Ductility of Steel Castings for Submarine Structures 1991-94.
- Chesapeake Engineering, Inc. and the U.S. Attorney Office, Baltimore, MD - Instability Analysis of Falsework in Investigating Bridge Failure During Construction on Route 198, 1991.
- ASME, Washington, DC - Risk-Based Inspection Guidelines - Phases I, II and II extension, 1991-96.
- Chevron Research and Technology Corporation, San Ramon, CA - Risk-Based Decision Making, and Handbook for Risk-Based Plant Integrity 1990-93.
- Interstate Division of Baltimore City and Wilson T. Ballard, Inc. - Cracking of Bridge Decks of the Johns Falls Expressway, Baltimore, MD, 1989.
- U. S. Bridge, OH - Redundancy Analysis of Truss Bridges, 1988-89.
- Potomac Electric Power Company, Washington, DC - Structural Strength of Precast, Prestressed Concrete Elements with Epoxy Coated Strands, 1986-87.
- Florida Wire and Cable Company, Jacksonville, FL - Structural Behavior of Prestressed Composite Steel/Concrete Beams with Coated Strands, 1986-88.
- Sheladia Associates, Inc., Riverdale, MD - Estimation of Bridge Design Life, 1987.
- Nussbaum, Owen and Webster, Washington, DC - Construction Safety, 1987.
- Sandbower, Gabler and O'Shaughnessy, P.A., Baltimore, MD - Design of Stairs, Handrails and Guards, 1987.
- U.S. Coast Guard, Groton, CT - Reliability Analysis of the Island-Class Patrol Boat, and Comparative Life Expectancy Assessment and Durability of Boat Hull Structure 1987-91.
- Kuwait Institute for Scientific Research, Kuwait - Bridge Management System, Load Bearing Walls, Azel Block Wall Construction, and Evaluation of Structural Testing Facilities Cost Allocation for Bridge Structures, 1985-87.
- Whitman, Requardt and Associates, Baltimore, MD - Design of a Prestressed Concrete Slab with Irregular Column Locations, 1985.
- AMPAT Southern Corp., MD - Reliability of Large Glass Panels in a 12-story Building, 1985.
- National Transportation Safety Board, Washington, DC - Structural and Safety Analysis of the Empennage Group of the Bandeirante Airliner from EMBRAER, Brazil, 1985.

#### **Fellowship, Journal Editorship, Membership and Others**

- ASCE, Distinguished Member (since 2017 for his leading contributions in uncertainty and risk analysis for infrastructure resilience and sustainability in a changing climate with life-cycle economics), member since 1980.
  - Member, ASCE Committee on Sustainability, since 2020.
  - Editor in Chief, ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems: Part A. Civil Engineering, and Part B. Mechanical Engineering, since 2014.
  - Associate Editor, Natural Hazard Review, ASCE, since 2011.
  - Associate Editor, J. of Structural Engineering, ASCE, 1995-98.
  - Member, ASCE Committee on Forensic Engineering, 1984-88.
  - Member, ASCE Committee on Practices to Reduce Failures, 1984-88.
  - Member, ASCE STD Committee on Safety of Buildings, 1986-89.
  - Member, ASCE STD Committee on Reliability of Offshore Structures, 1987-93.
  - Control group member, ASCE STD Committee on Reliability of Offshore Structures, 1991-93.
  - Vice-Chair, ASCE STD Committee on Reliability of Offshore Structures, 1992-93.
  - Chair, ASCE STD Committee on Reliability of Offshore Structures, 1993-96.
  - Member, ASCE EMD Committee on Probabilistic Methods, 1989-96.
  - Member, ASCE STD Committee on Fatigue Reliability, 1995-98.
  - Member, ASCE Committee on Petro-Chemical Energy, Energy Division, ASCE, 1991-92.
  - Chairman, Education Committee, ASCE Maryland Section, 1990-92.
  - Organized the seminar "The Engineer as a Manager," Education Committee, ASCE - Maryland Section, Baltimore, Maryland, 1991.
  - Organized and chaired many sessions in ASCE Structures Congress, and Specialty Conferences, since 1990.
  - Chair, Risk and Vulnerability Committee, ASCE CDRM, 2007-11.

- Vice Chair, Committee on the Adaptation to a Changing Climate, ASCE, 2010-present.
- ExCom, Infrastructure Resilience Division, ASCE, 2014-present.
- Co-Chair, Risk and Resilience Measurement Committee, Infrastructure Resilience Division, ASCE, 2014-present.
- Advisor, Executive Committee, ASCE CDRM, 2002-2012.
- Chair, ASCE Committee on Adaptation to a Changing Climate, 2016-17.
- Chair, ASCE Infrastructure Resilience Division, 2016-18.
- Chair, Past Vice Chair and Member, ASCE Committee on Technical Advancement, 2018-20.
- ASME, Honorary Member (since 2019 for distinguished leadership and contributions in risk analysis for the protection and lifecycle management of infrastructure systems using quantitative methods in economics and finances), member since 1990.
  - Editor in Chief, ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, since 2013.
  - Representative of Academic Institutions on ASME Research Task Force on Risk-Based Inspection of Industrial Facilities, 1987-2001.
  - Member of Applied Risk Committee, ASME, 1989-2003.
  - Member of ASME Committee on Human Factors Engineering, SERAD, 1990-95.
  - Member of ASME Research Committee on Risk-Based Technology, 1993-96.
  - Member of ASME Ad Hoc Task Group on Risk-based Technology (SG-D Section III), 1996-97.
  - Member of the Executive Committee of SERAD, ASME, 2002-06.
  - Chair, the Executive Committee of SERAD, 2006.
  - Appointed to ASME Codes and Standards Working Group on Valves (SG-D) (SC III), 2002-07.
  - Appointed to ASME Codes and Standards Working Group on Probabilistic Methods in Design (SG-D) (SC III) (N20070365), ASME, 2003-08.
  - Appointed to ASME Codes and Standards Working Group on Risk Analysis and Management for Critical Asset Protection (RAMCAP), ASME, 2005-06.
  - Chair, Risk Technology Committee, Center for Research and Technology Development, ASME, since 2010.
  - Member, Board for Research and Technology Development, ASME, since 2012.
- ASNE, Life Member, since 1985.
  - Editor (i.e., Journal Committee Chair) Naval Engineers Journal ASNE, 2000-05.
  - Member of the Naval Engineers Journal Committee, ASNE, 1990-2005.
  - Associate Editor, Naval Engineers Journal, ASNE, 2011-present.
- American Concrete Institute (ACI), Member, 1983-1996.
  - Member of ACI Committee 348 on Structural Safety, 1986-92.
  - Member of ACI 348 Subcommittee A on Probability-Based Building Code, 1986-92
  - Member of ACI 348 Subcommittee C on Long Term Serviceability/Safety of Structures, 1986-92.
  - Member of ACI 348 Subcommittee D on Construction, 1986-92.
- ASEE, Member, 1990-2002.
- Member of the Conference Committee, Fall meeting of the Middle Atlantic Section of ASEE, 1991.
- Post-Tensioning Institute, Professional Member, Phoenix, Arizona, 1987-90.
- SNAME, Fellow, 1989.
- Chairman of the Panel on Design Procedures & Philosophies for Ship Structures, 1996-2005.
- Committee member, the Journal of Ship Research, SNAME, 1997-2010.
- Institute of Electrical and Electronics Engineers, Senior Member, since 1995.
  - Computer Society (IEEE-CS), Member, 1993-95.
  - Reliability Society, 2001-03.
  - IEEE Robotic and Automation, 2001-04.
- North American Fuzzy Information Processing Society, Member, Binghamton, NY, 1990-2000.
- General Chairman, the Annual Conference of the North American Fuzzy Information Processing Society, University of Maryland, College Park, September 1995.
- American Academy of Mechanics, Member, 1988-99.
- U. S. Naval Institute, Life Member, since 1988.
- Society for Risk Analysis, Fellow, since 2002.



- Treasurer (elected), 2016-2018.
- Member of the SRA Engineering and Infrastructure Specialty Group (EISG), 2006-07.
- Contributor to the SRA Newsletter, 2006-07.
- Reviewer of papers for the Risk Analysis Journal, 2002-present.
- World Future Society, Member, 2002-05.
- Navy League of the United States (NLUS), Life Member, since 2002.
- Sigma Xi, the Scientific Research Society, Member, New Haven, CT, 1988-2000.
- Professional Engineer Registration, MD, License Registration Certification No. 16521, since 1988 (expires 06/13/2021).
- The International Symposium on Uncertainty Modeling and Analysis, Organizer, since 1989.
- General Chairman, the First International Symposium on Uncertainty Modeling and Analysis (ISUMA '90), ISUMA '93, ISUMA95, ISUMA03 and ISUMA11, University of Maryland.
- Organized and chaired several sessions in ISUMA'93, College Park, MD.
- The International Association for Structural Safety and Reliability, Member (by invitation), USA, Japan, Austria and others, Organizer of the International Conference on Structural Safety and Reliability (ICOSSAR), since 1988.
  - Member of the Scientific Committee for ICOSSAR'93, chair of sessions, Austria.
  - Member of the Scientific Committee for ICOSSAR'97, chair of sessions, Japan.
  - Member of the Scientific Committee for ICOSSAR'01, chair of sessions, USA.
- The National Competition "Odyssey of the Mind," Advisor to the Glenarden Woods Elementary School, Lanham, Maryland, 1987.
- Member of the International Advisory Committee for the International Workshop on Reliability of Offshore Operations, US National Institute of Standards and Technology, Gaithersburg, MD, US Mineral Management Service, Department of Interior, VA, March 1991.
- Senior Mentor for a Lilly Teaching Fellow, Dr. N. Kartam, for the 1990-91 academic year.
- Member of the Technical Program Committee for the Second International Conference on Probabilistic Safety Assessment and Management (PSAM II), San Diego, CA, March 1994.
- Berkeley Initiative in Soft Computing (BISC), University of California, Berkeley, CA, member 1996-2000. Member of the Special Interest Group (SIG), 2002
- Arab Scientists and Technologists Abroad (ASTS), 1992-1998.
- Invited to attend the First Congress of ASTA, Amman, Jordan, funded by the National Science Foundation (NSF) and the United Nations Education, Scientific and Cultural Organization (UNESCO) among others, through the University of Illinois at Urbana-Champaign, IL, 1992.
- Co-chairman of the Workshop on Infrastructure, Earthquake Engineering and Standards, the Second Congress of ASTS, Amman, Jordan, funded by NSF and UNESCO among others, through the University of Illinois at Urbana-Champaign, IL, 1994.
- Invited panelist on Inter-university Cooperation, the First TSS/ASTA International Conference on Technology Parks and Transfer of Knowledge, ASTS, Tunis, funded by UNESCO, through the University of Illinois at Urbana-Champaign, IL, 1996.
- Advisor to the Gulf Coast Region Maritime Technology Center for Selecting Projects for Funding, University of New Orleans, 1998 and 2000.
- Reliability, availability and Maintainability (RAM) Expert Working Group, Gulf Coast Region Maritime Technology Center, University of New Orleans, 1996-2000.
- National Research Council, Marine Board, Washington, DC.
- Member of the Design Work Group, Marine Structures Committee, 1994-98.
- Steering Committee Member, and Recorder for the Design Session, the Workshop and Symposium on the Prevention of Fracture in Ship Structures, Washington, DC, March 1995.
- Reviewer of "Application of Reliability Methods to Analysis and Design of Marine Structures," the Marine Board, Commission on Engineering & Technical Systems, Washington, D.C., 1987.
- US Coast Guard, and ASME, Washington, DC.
- Chair of the organizing committee for the Workshop on Risk-based Technologies: U. S. Coast Guard Applications, December 12-13, 1995. The workshop was funded by the U. S. Coast Guard. About 100 people attended the workshop. ASME published the proceedings.

- United Nations Development Fund (UNDP).
- Volunteer (with expenses paid by the UNDP) to assist the Palestinian Ministry of Housing with housing issues through the TOKTEN program, June/July 1996.
- Member of the Scientific Committee, the First Int. Symposium on Digital Earth Moving, September 2001.
- Member of the International Program Committee, the 9th International Conference on Fuzzy Theory and Technology that will be held in Cary, North Carolina, USA, 2003.
- Appointed to ASME Risk Assessment Group of Critical Assets Protection Initiative Steering Committee, 2002.
- American Association of University Professors, member 2002-10.
- University of Maryland Statistics Consortium, member 2003-2010.
- Invited peer reviewer, Reports of Risk Studies, Homeland Security Institute, Department of Homeland Security, Washington DC, 2005-06.

### **Refereeing Papers for Journals**

The following are examples and selected cases for demonstration purposes:

- Journal of Structural Engineering, ASCE.
- Journal of Performance of Constructed Facilities, ASCE.
- Journal of Engineering Mechanics, ASCE.
- Journal of Transportation Engineering, ASCE.
- Journal of Hydrological Engineering, ASCE.
- Journal of Construction Engineering and Management, ASCE.
- Journal of Computing in Civil Engineering, ASCE.
- Journal of Bridge Engineering, ASCE.
- Journal of Infrastructure Systems, ASCE.
- CE World, ASCE.
- ASCE Press, ASCE.
- Structural Journal, American Concrete Institute.
- International journal of Structural Safety, Elsevier Science Publishers.
- IEEE Transactions on Fuzzy Systems, Institute of Electrical and Electronics Engineers.
- FUZZ-IEEE 2000, Institute of Electrical and Electronics Engineers.
- Naval Engineers Journal, ASNE, Alexandria, Virginia.
- International journal of Systems Science, Elsevier Science Publishers.
- International journal of Probabilistic Engineering Mechanics, Elsevier Science Publishers.
- Journal of Grey System Theory and Practice, PRC.
- Journal of Reliability Engineering and System Safety.
- Journal of Fuzzy Mathematics.
- International journal of Marine Structures.
- Journal of Ship Research, SNAME.
- Journal of Experimental and Theoretical Artificial Intelligence, Taylor and Francis, UK.
- International Journal of Information Sciences.
- International Journal on Computational Structural Engineering.
- International Journal on Structural Engineering and Mechanics, Techno-Press, Korea.
- International Journal on Computational Statistics and Data Analysis.
- International Journal on Intelligent Information Systems, Kluwer Academic Publishers.
- International Journal on Finite Element in Analysis and Design.
- International Journal on Computer and Mathematics with Applications, Pergamon.
- International Journal of Computer-Aided Civil and Infrastructure Engineering.
- International Journal of Uncertainty, Fuzziness, and Knowledge-Based Systems.
- Journal of Fuzzy Sets and Systems.
- Journal of Mathematical and Computer Modelling.
- Journal of Modelling and Simulation.
- International Journal of General Systems, Gordon and Breach Science Publishers.

- Journal of Intelligent and Fuzzy Systems.
- Journal of Mathematics and Computers in Simulation.
- International Journal of Reliability Engineering and System Safety, Elsevier.
- International Journal of Engineering Structures, Elsevier.
- ASME Press and News
- IIT Transactions, Institute of Industrial Engineers.
- Journal of Ground Water, National Ground Water Association, Westerville, OH.
- International Journal of Applied Mathematics Letters, Pergamon.
- Journal of Applied Mechanics, ASME International, NY.
- Journal of Environmental Modeling & Software, Australian National University, Canberra, Australia.
- International Journal of Technological Forecasting and Social Change, Elsevier.
- Guest editor, Natural Hazard Review, ASCE, since 2011.

### **Other Editorial and Reviewing Activities**

- Member of the editorial board of the international journal Entropy by MDPI, Information Theory, Probability and Statistics, 2021-present.
- Member of the editorial board of the international journal Resilient Cities and Structures by Elsevier, 2021-present.
- National Science Foundation (NSF), Structures and Building Systems, Decision Risk and Management, Division of Internal Programs, Washington, D.C., Proposal Review Panel and Proposal Reviewer.
- Gulf Coast Region Maritime Technology Center, University of New Orleans, Proposal Review.
- Committee on Marine Structures, Marine Board, National Research Council, Washington, D.C., Research Project Reviewer, 1988.
- Member of the editorial board of the international Journal of Grey Systems, UK, 1990-92.
- Associate Editor-in-Chief of the Journal of Grey Systems, UK and PRC, 1991-92.
- Editor of the Journal of Grey System Theory and Practice, PRC, 1991-92.
- Member of a Peer Review Panel for the Assessment of Projects in the Federal Wind Energy Program of the Office of Renewable Energy Conversion, Department of Energy, 1991.
- An Advisory Editor of the Journal of Fuzzy Mathematics, 1992-1994.
- Member of the Editorial Board of the International Journal of General Systems, Gordon and Breach Science Publishers, since 2000.
- Member of the Editorial Board of the International Journal on Computational Structural Engineering, Editors in Chief are Alfredo H-S. Ang and Hyo-Nam Cho, since 2001.
- National Research Council, Office of International Affairs, Office of Central Europe and Eurasia, Washington, D.C., Proposal Review.
- U. S. Department of State, and U. S. Civilian Research and Development Foundation (CRDF), Science Centers Program, Arlington, VA, Proposal Review, 2003-2005.
- Member of the editorial board of the International Journal on Ships and Offshore Structures, Pusan National University, Korea, since 2004.
- European Science Foundation, Strasbourg Cedex, France, Proposal Review, 2005.
- Automation in Construction, an International Journal.
- Member of the Editorial Board of the Statistics, Optimization and Information Computing Journal, International Academic Press, Hong Kong, since 2013.

### **Department of Civil and Environmental Engineering, UMD**

The following are examples and selected cases for demonstration purposes:

- Member of CEE Diversity, Equity, and Inclusion Committee, 2022-present.
- Advisor, CEE Climate-Resilient Infrastructure Resilience Initiative, 2012-present.
- Advisor, CEE Infrastructure Resilience Initiative, 2018-present.
- Advisor, Kirlin Lectures, 2018.
- Member of the Faculty Development Committee, 2016-present.

- Chair, Civil Engineering Research Symposium on Infrastructure and Community Resilience, Sponsored by the national Research Council and the national Science Foundation, April 11, 2013.
- Scheduling Officer, 2011-13.
- Chair of the Awards Committee, 2010-11.
- Member of the Faculty Development Committee, 2008-09.
- Department Civil and Environmental Engineering Centennial Committee, 2006-08.
- Undergraduate Students Recruitment Committee, 2005-07.
- Department representative to the College Appointment, Promotions and Tenure, 2003-06.
- Chair of the Awards Committee, 2003-05.
- Member of the Review Panel for Promotions, 2002-03.
- Member of the Assistant Professor Review Panel, 2002-03.
- Member of the Mathematics Curriculum Group, 2002.
- Member of the Curriculum Committee, 2001-02.
- Member of the Executive Committee, 2000-01.
- Chair of Search Committee for One or Two Faculty Members in Project Management, 1999-00.
- Member of Search Committee for Three Faculty Members in Engineering Management, Systems Engineering, and Pavement Engineering, 1998-99.
- Member of Search Committee for Three Faculty Members in Engineering Management, Systems Engineering, and Transportation Engineering, 1997-98.
- Member of Search Committee for Two Faculty Members in Building, Construction, and/or Transportation Engineering, 1996-97.
- Member of Search Committee for Two Faculty Members in Geotechnical, Transportation or Environmental Engineering, 1995-96.
- Department Representative to a two-day workshop on Total Quality Management and Continuous Improvement, 1993.
- Member of Search Committee for a Faculty Member in Hydrologic Modeling, 1990-91.
- Member of Ph.D. Examination Committee in Structures, 1990-92.
- Group Leader of Structures, 1990-91.
- Organizer of the "Wood Seminar," sponsored by the American Institute of Timber, American Plywood Association, Southern Pine Marketing Council and Southern Pressure Treaters Association, 1990, 1992, 1994.
- Director of the Structural Testing and Reliability Laboratory, 1989-1993.
- Development of the Structural Testing and Reliability Laboratory, 1989.
- Chairman of Faculty Resource Committee, 1989.
- Member of a search committee for a faculty member in environmental engineering, 1989.
- Member of the Ph.D. Examination Committee in Structural Engineering, 1987-88.
- Member of the Task Group on External Relations, 1987.
- Development of the Structural Engineering Testing Facilities, 1985-87.
- Department Representative to Academically and Creatively Talented Open House, 1985.
- Development of Computer Software Library in Structural Engineering, 1985.
- Development of Requirements and Guidelines for Ph.D. Program in Structural Engineering, 1984.

#### **A. James Clark School of Engineering, UMD**

The following are examples and selected cases for demonstration purposes:

- Member of the Selection Committee, A. James Clack School of Engineering Early Career Distinguished Alumni Society, 2022.
- Member of the Engineering Council, 1984-87, 1989-90, 2008-13.
  - Chairman of Engineering Council and Engineering Faculty Assembly, 1987-89.
  - Vice Chair of College Engineering Council and Engineering Faculty Assembly, 2008-10.
  - Vice Chair of College Engineering Council and Engineering Faculty Assembly, 2012-13.
  - Member of Subcommittee on Guidelines and USP Courses for Engineering Students, 1985.
  - Member of Subcommittee on Engineering Software, 1986.
  - Member of Subcommittee on the College's Plan of Organization, 1988.
- Founding faculty member, Maryland Robotic Center, since 2010.

- Appointment, Promotions and Tenure, 2003-06, 2008-10
- Representative of the Department Civil and Environmental Engineering to the College
- Member of College of Engineering Committee on the Proposed New Library, 2000.
- Chairman of Ad Hoc Subcommittee on Service Activities, 1991-92.
- Member of Review Committee of the Department of Civil and Environmental Engineering, 1991-92.
- Member of Budget Planning Committee, 1990-91.
- College of Engineering planning retreat, April 26, 1988, Jan. 16, 1990
- Co-organizer of the "Time Management Workshop," College of Engineering, 1989.
- Member of the Center of Reliability Engineering, University of Maryland, College Park, 1985-present.
- Development of proposed M.S. and Ph.D. degree programs in reliability engineering, 1984-85.

### UMD Campus and Community

The following are examples and selected cases for demonstration purposes:

- Governor Martin O'Malley transition team, 2006-07.
  - Appointed to working group on higher education.
  - Appointed to working group on homeland security.
- University of Maryland Statistics Consortium, member since 2003.
- Campus APT Appeal Committee, Office of the President, member 2000.
- Task Force and Resource Groups on Graduate Education, member 1996.
- Selection Committee for the Distinguished Scholar-Teacher Award, member 1993-94.
- College of Engineering on Honors Program Council, representative 1991-93.
- Honor Review Board, Student Honor Council, member 1990-91.
- Lilly Teaching Fellowship
  - Senior Mentor for a fellow, 1990-91.
  - Selection Committee of Lilly Teaching Fellows, member 1991-92.
- Faculty Council of the University of Maryland, member 1984-86 and served on:
  - MPSE Female Faculty Salary Review Committee, 1985-86.
  - Adjunct Committee on Libraries, Computers and Other Instructional Resources, 1985-86.
  - Senate Subcommittee on Improving Effectiveness in Teaching, April 17, 1989.
  - Review Committee for the Improvement of Instruction Proposals, Office of the Dean for Undergraduate Studies, 1990.
- Graduate School, member since 1986.

### Corporate Contributions to UMD

Dr. Ayyub arranged and negotiated the following corporate contributions to the Department of Civil and Environmental Engineering, University of Maryland (selected cases for demonstration purposes):

- A data acquisition system from OPTIM Electronics, Germantown, MD, \$22,000, 1986.
- Prestressing strands from Florida Wire and Cable Company, FL, approximately \$4,000, 1986.
- Prestressing end anchorages, rams and pumps from VSL Corporation, VA, approximately \$5,000, 1986.
- Concrete, Super Concrete Corporation, Washington, D.C. approximately \$2,000, 1986-87.
- Cash contribution, Marine Soft, Germany \$30,000, 1999-02.
- Three HMMWV's and Support for Developing a Platform of Autonomous, Intelligent, Collaborative HMMWV's, Equipment Donated in 2003, valued at \$100,000.
- Research Support, American Boat and Yacht Council, \$50,000.
- Research Support on Intelligent Driving, Fredrick Auto Center, Maryland, \$23,500.
- Exhibit space and promotional support (Gift), E. J. Krause, Rockville, MD, \$5,000.
- Kuwait Institute for Scientific Research (Gift), \$15,000.

### Course Teaching

<u>Description</u>	<u>Course Number</u>	<u>Number of Offerings</u>
• Engineering Information Processing II	ENCE 201	1
• Computational Methods in Civil Engineering I	ENCE 202	1
• Computational Methods in Civil Engineering II	ENCE 203	5
• Mechanics of Materials	ENES 220	6

• Probability and Statistics for Civil Engineers (includes S2016)	ENCE 302	27
• Introduction to Structural Analysis (includes S2016)	ENCE 353	7
• Design of Concrete Structures	ENCE 451	5
• Decision Analysis for Engineers	ENCE 425	1
• Analysis of Civil Engineering Systems I	ENCE 461	1
• Structural Reliability	ENCE 615	15
• Risk Analysis for Engineering (includes S2016)	ENCE 620	17
• Uncertainty Modeling and Analysis (includes S2016)	ENCE 621	10
• Engineering Analysis	ENCE 660	2
• Intelligent Systems	ENCE 688I	1
• Advanced Reinforced Concrete Design	ENCE 713	7
• Prestressed Concrete Structures	ENCE 714	7
• Advanced Structural Systems	ENCE 718	2

### Course and Curriculum Development

- Structural Reliability or Risk Analysis in Engineering, ENCE 688K, S1984.
- Doctor of Philosophy and Master of Science in Reliability Engineering Degrees, F1986.
- Computational Methods in Civil Engineering II, ENCE 302, S1991.
- Computational Methods in Civil Engineering I, ENCE 202, F1996.
- Decision Analysis for Engineers, ENCE 425, F1999.
- Risk Analysis for Engineering, ENCE 620, S2000.
- Uncertainty Modeling and Analysis, ENCE 621, F2001.
- Intelligent Systems, ENCE 688I, S2003.
- Graduate Program in Project Management, 1998-00.
- Engineering Information Processing II, ENCE 201, S2006.
- Introduction to Structural Analysis, ENCE 353, S2009.

### Supervising Doctoral Students

#### Doctoral Graduate and

#### Graduation Year

#### Position (might not be current)

D. Dzedzy (ENRE)	Ongoing
Y. Mao (ENRE)	Ongoing
A. Khalek (ENRE)	Ongoing
J. Banton (ENRE)	Ongoing
Y. Saadat 2021	NRC Fellowship, NIST
H. Hu 2019	Consultant in Chicago
Y. Zhang 2019	National Institute of Standards and Technology
S. Mishra 2018	Stanford University, AI Index
R. Emanuel 2018	APL, The Johns Hopkins University
D. Webb 2017	Applied Economics Office, National Institute of Standards and Technology
M. Ghoniema 2015	Projects Control Manager (Senior Associate) JMT
C.-Y. Chang 2012	Engineer, Lawrie and Associates
W. L. McGill 2008	Assistant Professor, Penn State University
K. Avriithi 2007	Assistant Professor, University of Houston
A. Al-Wazeer 2007	University Professor
P. Hess III 2002	Program Director, Office of Naval Research
M. Al-Fadhala 2002	Assistant Professor, University of Kuwait
R. Wilcox 2001	Science Advisor, Chief of Naval Operations
H. Kamal 2001	Researcher, Kuwait Institute for Scientific Research
W. Bender 2000	Elected Kuwaiti Official, Kuwait Municipality Council Professor and chair, University of Washington, Seattle, WA <a href="http://cm.be.washington.edu/faculty-profile/William/Bender">http://cm.be.washington.edu/faculty-profile/William/Bender</a>
A. N. Blair 1999	Program Manager, The World Bank
K. Eloasily 1998	Engineering Group Supervisor, Bechtel Corporation

I. Assakkaf 1998	Researcher, Kuwait Institute for Scientific Research
K. Atua 1998	Sr. Reliability Manager at Baxter Healthcare
Y.-H.O. Chang 1996	Unknown
R. Chao 1995	Unknown
M.H.M. Hassan 1992	Professor, The British University in Egypt
K.-L. Lai 1992	Unknown
C.-Y. Chia 1992	Unknown
A. Ibrahim 1991	Senior Researcher, Kuwait Institute for Scientific Research
N.M. Al-Mutairi 1989	Director General, Kuwait Institute for Scientific Research
Y.G. Sohn 1988	Chief, Structural Dynamics Branch, Defense Threat Reduction Agency
Z. Eldukair 1988	Businessman and Investor
G.J. White 1986	Professor, Director of Naval Architecture, U. S. Naval Academy

### Supervising Master of Science Students

(*co-advised)			(*co-advised)		
<u>Name</u>	<u>Option</u>	<u>Completion Year</u>	<u>Name</u>	<u>Option</u>	<u>Completion Year</u>
A.B. Abdulrashid	Thesis	1985	T. Boutaleb	Scholarly Paper	1999
A. Zerrouk	Thesis	1986	B. L. Erickson	Scholarly Paper	1999
R. White	Thesis	1986	G. Bhamidipaty	Scholarly Paper	2001
G.S. Cheok	Thesis	1986	N. Rihani	Scholarly Paper	2002
Y.G. Sohn	Scholarly Paper	1986	N. Tull	Scholarly Paper	2006
R. Kadissi	Thesis	1987	M. Manofsky	Scholarly Paper	2007
I. Hanieh	Scholarly Paper	1987	S. Otto	Scholarly Paper	2007
K. Handal	Scholarly Paper	1987	J. Ramirez	Scholarly Paper	2010
A. Ibrahim	Thesis	1987	E. Zeilah	Thesis	2012
K.-L. Lai	Thesis	1989	D. Webb	Thesis	2012
J. Parekh	Scholarly Paper	1989	A. Knupp	Scholarly Paper	2012
P. Patel	Scholarly Paper	1990	T. Nguyen	Scholarly Paper	2012
C.H. Wong	Scholarly Paper	1990	G. M. Khirallah	Scholarly Paper	2013
A.J. Bagde	Scholarly Paper	1990	M. Gierson*	Thesis	2015
A. Samuel	Scholarly Paper	1990	B. Crespo	Thesis	2016
J. Yao	Scholarly Paper	1991	S. Cao	Thesis	2020
C.W. Carlson	Scholarly Paper	1991	S. Saleem	Thesis	2020
A. Shaikh	Scholarly Paper	1992	Y. Mao	Thesis	2021
M. Abu-Kassem	Scholarly Paper	1993	H. Majed	Thesis	2021/22
B. Waggoner	Scholarly Paper	1996	S. Elsibaie	Ongoing	
C. Popescu	Thesis	1998			
C. Smith	Thesis	2000			

### Teaching and Advising: Research Advisor of Bachelor of Science Students (selected)

<u>Name</u>	<u>Option</u>	<u>Completion Year</u>
A. Kuhon	Undergraduate Research	2017-18
N. Cynkar	Undergraduate Research	2017-18
S. Halper	Undergraduate Research	2017
N. Qureshi	Undergraduate Research	2011
H. G. Braileanu	Undergraduate Research	2011
T. Soave	Undergraduate Research (French Intern)	2010
V. Yoann	Undergraduate Research	2010
P. Broqueres	Undergraduate Research (French Intern)	2101
N. Wagman	Undergraduate Research	2009
A. Bui	Undergraduate Research	2009
M. Quinet	Undergraduate Research (French Intern)	2008
N. Miles (ENAE)	Undergraduate Research	2008
E. Zeilah (ENME)	Undergraduate Research	2009
J. McGrath (ENCE)	Undergraduate Research	2008
J. Hanacek	Maryland Center for Undergraduate Research	2006
M. Boyer	Maryland Center for Undergraduate Research	2006

I.A. Alvi	Honors Research Study	1989
T.F. Bell-Wright	Honors Research Study	1988
I.A. Alvi	Undergraduate Apprentice in Research & Scholarship	1988

### Supervising Postgraduate Researchers and Visiting Scholars

- Ms. Yanjie Zhang, Tongji University, Shanghai, China 2017-19.
- Dr. Robert Finkelstein, Research Associate, Co-Director of the Intelligent Systems Laboratory, since 2008.
- Dr. Andrew Blair, Research Associate, Maryland Emergency management Agency Project on Homeland Security, 2007-present.
- Dr. Siddhartha Lahiri, Research Associate, Maryland Emergency management Agency Project on Homeland Security, Spring 2005 and Fall 2006.
- Mr. George DeBake, Research Associate, Maryland Emergency management Agency Project on Homeland Security, Spring 2005 and Fall 2006.
- Dr. Robert Finkelstein, Research Associate, Maryland Emergency Management Agency Project on Homeland Security, Spring 2005 and Fall 2006.
- Ms. Clara Popescu, Research Associate, Maryland Emergency management Agency Project on Homeland Security, Spring 2005 and Fall 2006.
- Mr. Jon Vidar Jonsson, Visiting Scholar, Supported by Barlindhaug Consult AS, Norway, 2002-03.
- Dr. Maged Morcos, Fulbright Scholar from Egypt, Fulbright Program for Senior Scholars, Supported by a grant from the Council for International Exchange of Scholars, 2002-03.
- Dr. Mark Kaminskiy, Senior Researcher, Supported by a grant from the University of New Orleans for the Office of Naval Research, since 2000.
- Dr. Ibrahim Assakkaf, Postdoctoral researcher, Supported by a grant from the University of New Orleans for the Office of Naval Research, since 1999.
- Dr. Gilberto F. M. de Souza, Visiting Scholar, Associate Professor of Mechanical Engineering, University of Sao Paulo, Brazil, Supported by CAPES of the Brazilian Federal Government, 1999-00.
- Dr. Rafi Muhanna, Faculty Researcher and Lecturer, 1994-95, Supported by U.S. Navy and UMD.
- Professor Tan Chengye, Head of the Seismological Bureau of Yunan Province, Peoples Republic of China, Visiting Scholar, Funded by the C.C. Wu Cultural and Educational Foundation Fund, 1991-92.
- Mr. Samir L. Kamel, Peace Fellow and Trainee in Construction Engineering, Funded by the Agency for International Development through the Embassy of Egypt to the USA, 1991-92.
- Dr. Hamid Saadatmanesh, Faculty Research Associate, May 1986 to August 1986, and Visiting Assistant Professor - August 1986 to August 1987, Supported by NSF grants.

### On PhD Dissertation Committees (selected)

The following list is incomplete:

<u>Selected Graduates</u>	<u>Year</u>	<u>Selected Graduates</u>	<u>Year</u>
N. Yazdani	1984	A. K. Ghosh	1998
H. Shaaban	1984	V. V. Krivtsov	2000
H. Saadatmanesh	1986	R. Valentin	2004
K. Tawfiq	1986	M. A. H. Assaf	2004
S.A. Chini	1986	R. R. Sebastianelli Jr.	2005
H. Hijazi	1986	C. A. Salgado	2005
D. Panagiotopoulos	1988	Sanjay Tiku	2005
I-C. Lin	1988	A. V. Kleyner	2005
N.H. Galdos	1988	Yuki Fukuda	2005
R. Hariri	1989	Nikhil Vichare	2006
M. Azmi	1989	M.-L., Wu	2006
Y.A. Mohieldin	1989	P. Radha, IIT, India	2006
J.-N. Wang	1990	J. Hurtado-Cahuao	2006
P.A. Johnson	1990	N. Williams	2007
L. Moumena	1990	J. Gu	2008
M.I. Elhelbawey	1991	K. M. Gaulke	2009
A. Mirmiran	1991	M. LaBaw	2009



J.H. Kim	1991
L. Jump	1992
A.A. Malik	1992
S. Praharaaj	1992
K.-S. Hsueh	1992
L.-K. Liu	1993
H. Fang	1993
H.M. Fouad	1993
X. Zhang	1994
Y.-S. Hu	1994
E.B. Golfeiz	1994
D.-T. Lin	1994
R.-L. Sun	1995
A.D. Adrian	1996
V. Ragavan	1997

M. Nagem	2009
R. Nelson, III	2011
N. Moghaddasi	2011
S. Cheng	2011
T. Jazouli	2011
N. S. M. Bonab	2011
B. A. Weiss	2012
R. Li	2013
L. Petnga	2016
A. Paraschos	2016
X. Liu	2016
Y. Aliabadizadeh	2016
A. Keivan	2018
H. Liu	2018
J. Wu	2018
M. Xu	2018

Not all students are listed

### On MS Thesis Committees (selected)

The following list is incomplete:

<u>Selected Graduates</u>	<u>Year</u>
S. Haghkchah	1984
Y-T. Hsu	1984
G. Karas	1984
P. Broe	1984
A. Paredes	1986
J. Liu	1986
H. Eimi	1986
B. Chen	1986
M. Mahi	1986
M. Mafi	1986
J.G. McCarthy	1988
C. Zammit	1988
I.Z. Stern	1988
R. Brown	1989
D.C. Frantzis	1989
R.R. Mullangi	1989

<u>Selected Graduates</u>	<u>Year</u>
M.E. Bragdon	1990
H.M. Fouad	1990
A.M. Hadavi	1990
B. Purvi	1990
J. George	1991
H.M. Fouad	1991
F. Beshah	1992
V. Ragavan	1992
Q. Mu	1996
A. N. French	1998
K. Kanitpong	1999
C. McCall	1999
R. W. Michaelson	2000
M. F. Genc	2001
E. Mahoney	2007
K. S. Markham	2010
J. Tembunkart	2013
Others not listed	

# Curriculum Vitae

September 5, 2022

Bilal M. Ayyub, PhD, PE, Dist.M.ASCE, Hon.M.ASME, F.SEI, F.SNAME, F.SRA

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