

Curriculum Vitae

Raymond J. Madachy, Ph.D.

Professor

Naval Postgraduate School

Department of Systems Engineering

rjmadach@nps.edu

Research Interests

Digital engineering tool environments, modeling and simulation of systems and software engineering processes, generative AI, system cost modeling, affordability and tradespace analysis, integrating systems and software engineering disciplines, intellectual property valuation, software litigation, systems engineering and lawmaking.

Education

University of Southern California

Ph.D. Industrial and Systems Engineering, 1994

Areas: systems engineering, systems architecting, computer science

Dissertation: “A Software Project Dynamics Model for Process Cost, Schedule and Risk Assessment”

University of California, San Diego

M. S. System Science, 1983

Comprehensive exam covered digital signal processing and system dynamics

Research in bio-engineering, orbital mechanics and man-machine interface

University of Dayton

B.S. Mechanical Engineering, 1981

Minor: Aerospace Engineering

Magna Cum Laude

Professional Experience

2008-present	Naval Postgraduate School Professor, Department of Systems Engineering, 2018-present Associate Professor, Department of Systems Engineering, 2008-2018
2005-2008	University of Southern California Research Assistant Professor and Interim Director of Systems Architecting and Engineering Program, Department of Industrial and Systems Engineering, 2007-2008 Research Scientist, Departments of Industrial and Systems Engineering and Computer Science, 2005-2007
2001-2005	Chief Science Officer, Cost Xpert Group Inc.
2001-2005 (part-time)	Research Associate, University of Southern California, Department of Computer Science
2000-2001	Chief Scientist, C-bridge Internet Solutions, C-bridge Institute
1992-2000	Litton Systems Manager, Software Engineering Process Group, Litton Guidance & Control Systems, 1997-2000 Senior Engineering Specialist, Litton Data Systems, 1992-1997
1988-1992	Librascope Corporation Staff Engineer, 1991-1992 Lead Software Engineer, 1989-1991 Programming Research Specialist, 1988-1989

1987-1988	Laboratory Manager, University of California, Los Angeles
1985-1986	Independent Contractor, TRW Electronics and Defense, Advanced Programs Division
1982-1985	Member of Technical Staff, Hughes Aircraft Co., Radar Systems
1981-1982	Aerospace Engineer, General Dynamics, Convair

Publications

Books

- [1] R. Madachy. *What Every Engineer Should Know About Python*. CRC Press, Boca Raton, FL, 2025.
- [2] R. Madachy and D. Houston. *What Every Engineer Should Know About Modeling and Simulation*. CRC Press, Boca Raton, FL, 2017.
- [3] B. Clark and R. Madachy, editors. *Software Cost Estimation Metrics Manual for Defense Systems*. Software Metrics Inc., Haymarket, VA, 2015.
- [4] R. Madachy. *Software Process Dynamics*. Wiley-IEEE Press, Hoboken, NJ, 2008.
- [5] B. Boehm, C. Abts, W. Brown, S. Chulani, B. Clark, E. Horowitz, R. Madachy, D. Reifer, and B. Steece. *Software Cost Estimation with COCOMO II*. Prentice-Hall, 2000.

Conference Proceedings Books (Editor)

- [6] Q. Wang, V. Garousi, R. Madachy, and D. Pfahl (Eds.). *Trustworthy Software Development Processes, International Conference on Software Process 2009*. Springer, Berlin-Heidelberg, Vancouver, Canada, 2009.

Chapters in Books

- [7] R. Madachy, R. Bell, and R. Longshore, “A Generative AI-driven Systems Engineering Maturity and Cost Modeling Framework,” in *Proceedings of the 22nd Annual Conference on Systems Engineering Research (CSER)*, A. M. Madni, D. Verma, M. Sievers, M. Wheaton, E. Ordoukhanian, and S. Purohit, Eds. Cham, Switzerland: Springer, 2025.
- [8] R. Madachy, and R. Valerdi. Expert COSYSMO Systems Engineering Cost Model and Risk Advisor. In N. Scala and J. Howard, editors, *Handbook of Military and Defense Operations Research*. CRC Press, Boca Raton, FL, 2020.
- [9] International Council on Systems Engineering (INCOSE). “Project Planning” in *Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities, Version 4.0*. John Wiley & Sons, Hoboken, NJ, 2015.
- [10] A. Pyster, D. Olwell, N. Hutchison, S. Enck, J. Anthony, D. Henry, and A. Squires (Eds.). *Systems Engineering Management. Guide to the Systems Engineering Body of Knowledge (SEBoK) version 1.0.1*. Hoboken, NJ: The Trustees of the Stevens Institute of Technology 2012. URL <http://www.sebokwiki.org>.
- [11] A. Pyster, D. H. Olwell, T. L. J. Ferris, N. Hutchison, S. Enck, J. Anthony, D. Henry, and A. Squires(Eds.). *Expected Background for Students Entering a Master’s Program. Graduate Reference Curriculum for Systems Engineering (GRCSE)*. Hoboken, NJ, USA:The Trustees of the Stevens Institute of Technology. Available at, 2012. URL <http://www.bkcase.org/grcse/>.
- [12] D. Petkov, D. Edgar-Nevill, R. Madachy, and R. O’Connor. Towards a wider application of the systems approach in information systems and software engineering. In D. Paradice, editor, *Emerging Systems Approaches in Information Technologies: Concepts, Theories and Applications*. IGI Publishing, 2010.
- [13] D. Petkov, D. Edgar-Nevill, R. Madachy, and R. O’Connor. Information systems, software engineering and systems thinking: Challenges and opportunities. In M. Gordon Hunter, editor, *Strategic Information Systems: Concepts, Methodologies, Tools and Applications*. IGI Publishing, 2009.

- [14] R. Madachy and B. Boehm. *"Software Dependability Applications" in Software Process Modeling*. Kluwer Academic Publishers, 2004.
- [15] R. Madachy. *"Simulation in Software Engineering" in Encyclopedia of Software Engineering*. Wiley and Sons, Inc., New York, NY, second edition, 2001.

Refereed Journal Papers

- [16] R. Bell, R. Madachy, and R. Longshore. Balancing accuracy and cost: Trade-offs in large language model quantization for the systems engineering domain. *Systems Engineering*, 2026. doi: [10.1002/sys.70061](https://doi.org/10.1002/sys.70061).
- [17] R. Bell, R. Longshore, R. Madachy, and A. Hanrahan. Baselineing large language model performance in systems engineering using SysEngBench. *Systems Engineering*, 2026. doi: [10.1002/sys.70067](https://doi.org/10.1002/sys.70067).
- [18] Rosa, W., Clark, B., Madachy, R. & Boehm, B. Empirical Effort and Schedule Estimation Models for Agile Processes in the US DoD. *IEEE Transactions On Software Engineering*. 48(8), 2022.
- [19] H. Zhang, D. Raffo, T. Birkholzer, D. Houston, R. Madachy, J. Munch, and S. Sutton. Software process simulation — at a crossroads? *Journal of Software: Evolution and Process*, 2014.
- [20] E. Kocaguneli, T. Menzies, J. Keung, D. Cok, and R. Madachy. Active learning and effort estimation: Finding the essential content of software effort estimation data. *IEEE Transactions on Software Engineering*, 99, December 2012.
- [21] T. Menzies, S. Williams, O. Elrawas, D. Baker, B. Boehm, J. Hihn, K. Lum, and R. Madachy. Accurate estimates without local data. *Software Process Improvement and Practice*, 14, 2009.
- [22] R. Madachy. Cost modeling of distributed team processes for systems of systems and global development. *Software Process Improvement and Practice*, 2008.
- [23] D. Petkov, D. Edgar-Nevill, R. Madachy, and R. O'Connor. Information systems and software engineering and systems thinking: Challenges and opportunities. 2008.
- [24] T. Menzies, O. Elwaras, J. Hihn, Feather M., B. Boehm, and R. Madachy. The business case for automated software engineering. *IEEE Automated Software Engineering*, 2007.
- [25] R. Valerdi and R. Madachy. Impact and contributions of mbase on software engineering graduate courses. *Journal of Systems and Software*, 80(8), August 2007.
- [26] R. Madachy, B. Boehm, and J. Lane. Assessing hybrid incremental processes for sisos development. *Software Process Improvement and Practice*, 2007.
- [27] B. Boehm, L. Huang, A. Jain, and R. Madachy. Reasoning about the roi of software dependability: the idave model,. *IEEE Software*, 21(3), 2004.
- [28] R. Madachy and D. Taret. Case studies in software process modeling with system dynamics. *Software Process Improvement and Practice*, (Spring), 2000.
- [29] K. Bennett, E. Burd, C. Kemerer, M. Lehman, M. Lee, R. Madachy, C. Mair, D. Sjoberg, and S. Slaughter. Empirical studies of evolving systems. *Empirical Software Engineering*, 4(4):370–380, December 1999.
- [30] M. Kellner, R. Madachy, and D. Raffo. Software process simulation modeling: Why? what? how? *Journal of Systems and Software*, (Spring), 1999.
- [31] B. Boehm, A. Egyed, D. Port, A. Shah, J. Kwan, and A R. Madachy. Stakeholder win-win approach to software engineering education. *Annals of Software Engineering*, 6, 1998.
- [32] B. Boehm, A. Egyed, J. Kwan, A. Shah, and R. Madachy. Using the winwin spiral model: A case study. *IEEE Computer*, 1998.
- [33] R. Madachy and B. Khoshnevis. Dynamic simulation modeling of an inspection-based software lifecycle process. *Simulation*, 69(1), July 1997.
- [34] R. Madachy. Heuristic risk assessment using cost factors. *IEEE Software*, 1997.

- [35] R. Madachy. Knowledge-based risk assessment and cost estimation. *Automated Software Engineering*, 1995.
- [36] B. Boehm, B. Clark, E. Horowitz, C. Westland, R. Madachy, and R. Selby. Cost models for future software life cycle processes: Cocomo 2.0. *Annals of Software Engineering*, pages 57–94, 1995.

Refereed Magazine and Practitioner Articles

- [37] R. Madachy. Trustworthy AI for quantitative systems engineering via deterministic delegation to verified tools. *INCOSE INSIGHT*, 29(3):58–66, June 2026.
- [38] R. Madachy, D. O’Leary, T. McDermott, and S. Bank. Twenty tips for using generative AI in systems engineering. *INCOSE INSIGHT*, 29(3):29–31, June 2026.
- [39] R. Madachy, B. Boehm, and D. Houston. Modeling software defect dynamics. *DoD Software Tech News*, 13(1), April 2010.
- [40] B. Boehm, E. Horowitz, R. Madachy, and C. Abts. Future trends, implications in cost estimation models. *Crosstalk*, 2000.
- [41] R. Madachy and D. Tarbet. Initial experiences in software process modeling. *Software Quality Professional*, (Spring), 2000.

Refereed Conference Papers Rigorously Peer Reviewed

- [42] P. Wach, R. Bell, B. Jugan, R. Longshore, and R. Madachy. The Cost of Expertise: Performance Trade-Offs in LLMs for Systems Engineering. In *Proceedings of the 35th International Symposium of INCOSE*, 2025.
- [43] R. Madachy, R. Bell, and R. Longshore. A Generative AI-Driven Systems Engineering Maturity and Cost Modeling Framework. In *Proceedings of the 2025 Conference on Systems Engineering Research*. Procedia Computer Science, 2025.
- [44] R. Bell, R. Longshore, and R. Madachy. Exploring Visual Question Answering Capabilities of Multi-Modal Large Language Models with Model Based Systems Engineering Models. In *Proceedings of the Acquisition Research Symposium*, Acquisition Research Program, 2025.
- [45] R. Bell, R. Longshore, and R. Madachy. Automating AI Expert Consensus: Feasibility of Language Model-Assisted Consensus Methods for Systems Engineering. In *Proceedings of the Acquisition Research Symposium*, Acquisition Research Program, 2025.
- [46] R. Madachy and J.M. Green. System Product Line Cost and Investment Modeling Applied to UUVs. In *Proceedings of the 21st Annual Acquisition Research Symposium*. Acquisition Research Program, 2024.
- [47] R. Bell, R. Longshore, and R. Madachy. Introducing SysEngBench: A Novel Benchmark for Assessing Large Language Models in Systems Engineering. In *Proceedings of the 21st Annual Acquisition Research Symposium*. Acquisition Research Program, 2024.
- [48] R. Longshore, R. Bell, and R. Madachy. Leveraging Generative AI to Modify and Query MBSE Models. In *Proceedings of the 21st Annual Acquisition Research Symposium*. Acquisition Research Program, 2024.
- [49] R. Madachy, R. Bell, and R. Longshore. Systems Acquisition Cost Modeling Initiative for AI Assistance. In *Proceedings of the 21st Annual Acquisition Research Symposium*. Acquisition Research Program, 2024.
- [50] R. Madachy, and J.M. Green. Systems and Cost Effectiveness Modeling of Unmanned Systems Product Lines for Acquisition. In *Proceedings of the 19th Annual Acquisition Research Symposium*, Acquisition Research Program, 2022.
- [51] R. Madachy, W. Rosa, and B. Clark. New Effort and Schedule Estimation Models for Agile Processes in the US DoD. In *Proceedings of the 19th Annual Acquisition Research Symposium*, Acquisition Research Program, 2022.
- [52] W. Rosa, R. Madachy, C. Wallshein, B. Clark, and B. Boehm. Early phase cost models for agile software processes in the us dod. In *Proceedings of the 2017 ACM / IEEE International Symposium on Empirical Software Engineering and Measurement*, Toronto, Canada, November 2017. Best Paper Award.

- [53] R. Madachy. System dynamics behaviors for modeling lawmaking processes. In *Proceedings of the 4th Annual Science of Laws Conference*. The Science of Laws Institute, November 2017.
- [54] R. Madachy. System dynamics structures for modeling lawmaking processes. In *Proceedings of the 3rd Annual Science of Laws Conference*. The Science of Laws Institute, 2016.
- [55] W. Rosa, B. Boehm, R. Madachy, B. Clark, C. Jones, J. McGarry, C. Wallshein, and N. Lanham. Early phase software effort and schedule estimation models. In *Proceedings of the 2015 International Cost Estimating and Analysis Association Conference*, June 2015. Best Paper Award.
- [56] W. Rosa, R. Madachy, B. Boehm, and B. Clark. Simple empirical software effort estimation model. In *Proceedings of the 8th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement*, September, 2014. ACM/IEEE.
- [57] R. Turner, R. Madachy, D. Ingold, and J. Lane. Modeling kanban processes in systems engineering. In *Proceedings of the 2012 International Conference on Software and System Process*, Zurich, Switzerland, 2012. IEEE.
- [58] R. Turner, R. Madachy, D. Ingold, and J. Lane. Improving systems engineering effectiveness in rapid response development environments. In *Proceedings of the 2012 International Conference on Software and System Process*, Zurich, Switzerland, 2012. IEEE Computer Society.
- [59] J. Wirthlin, D. Houston, and R. Madachy. Defense acquisition system simulation studies. In *Proceedings of the 2011 International Conference on Software and System Process*, Waikiki, HI, 2011. IEEE Computer Society.
- [60] R. Madachy, B. Boehm, B. Clark, T. Tan, and W. Rosa. Us dod application domain empirical software cost analysis. In *Proceedings of 2011 Empirical Software Engineering and Measurement International Symposium*, Banff, Canada, September 2011. IEEE Computer Society.
- [61] R. Madachy, R. Valerdi, and G. Wang. Interdisciplinary impacts: A tribute to prof. barry w boehm. In *Proceedings of the Barry W. Boehm Symposium*, Beijing, China, 2011. International Journal of Software and Informatics.
- [62] T. Birkholzer, R. Madachy, D. Pfahl, D. Port, H. Beitingger, M. Schuster, and A. Olkov. A library of reusable components for software process simulation. In *Proceedings of the 2010 International Conference on Software Process*, Paderborn, Germany, 2010.
- [63] R. Madachy and B. Boehm. Assessing quality processes with ODC COQUALMO. In *Proceedings of the 2008 International Conference on Software Process*, Leipzig, Germany, 2008.
- [64] R. Madachy. Distributed global development parametric cost modeling. In *Proceedings of the 2007 International Conference on Software Process*, Minneapolis, MN, 2007.
- [65] R. Valerdi and R. Madachy. Impact and contributions of mbase on software engineering graduate courses. In *Proceedings of 19th Conference on Software Engineering Education and Training*, IEEE Computer Society, 2006. Turtle Bay, HI.
- [66] R. Madachy. Reusable model structures and behaviors for software processes. In *Proceedings of the Software Process Workshop/Workshop on Software Process Simulation 2006*, Shanghai, China, May 2006. Springer-Verlag.
- [67] R. Madachy, B. Boehm, and J. Lane. Spiral lifecycle increment modeling for new hybrid processes. In *Proceedings of the Software Process Workshop/Workshop on Software Process Simulation 2006*, Shanghai, China, May 2006. Springer-Verlag.
- [68] R. Madachy. Simulation for business value and software process/product tradeoff decisions. In *Proceedings of The 8th International Workshop on Economics-Driven Software Engineering Research at the 28th International Conference on Software Engineering*, Shanghai, China, 2006. IEEE Computer Society.
- [69] R. Madachy. Integrating business value and software process modeling. In *Proceedings of the 2005 Software Process Workshop*, Beijing, China, May 2005. Springer-Verlag.

- [70] R. Madachy. Software process and business value modeling. In *Proceedings of the 6th International Workshop on Software Process Simulation and Modeling*, St. Louis, MI, 2005. IEEE.
- [71] R. Madachy. People applications in software process modeling and simulation. In *Proceedings of the 6th International Workshop on Software Process Simulation and Modeling*, St. Louis, MI, 2005. IEEE.
- [72] R. Madachy. A software product business case model. In *Proceedings of the 5th International Workshop on Software Process Simulation and Modeling*, 2004.
- [73] B. Boehm, L. Huang, A. Jain, and R. Madachy. Quality as stakeholder value. In *Proceedings of the Second Workshop on Software Quality*. IEEE Computer Society, 2004.
- [74] B. Boehm, J. Bhuta, D. Garlan, E. Gradman, L. Huang, A. Lam, R. Madachy, N. Medvidovic, K. Meyer, S. Meyers, G. Perez, K. Reinholtz, R. Roshandel, and N. Rouquette. Using empirical testbeds to accelerate technology maturity and transition: The scrover experience. In *Proceedings of the 2004 International Symposium on Empirical Software Engineering*. IEEE Computer Society, 2004.
- [75] B. Boehm, A. W. Brown, R. Madachy, and A Y. Yang. Software product line life cycle cost estimation model. In *Proceedings of the 2004 International Symposium on Empirical Software Engineering*. IEEE Computer Society, 2004.
- [76] Y. Chen, B. Boehm, R. Madachy, and R. Valerdi. An empirical study of eservices product uml sizing metrics. In *Proceedings of the 2004 International Symposium on Empirical Software Engineering*. IEEE Computer Society, 2004.
- [77] R. Madachy and D. Tarbet. Case studies in software process modeling with system dynamics. In *Proceedings of the ProSim 1999 Workshop*, Silver Falls, OR, June 1999.
- [78] B. Boehm, A. Egyed, J. Kwan, and R. Madachy. Developing multimedia applications with the winwin spiral model. In *Proceedings of the Sixth European Software Engineering Conference and Fifth ACM SIGSOFT Symposium on the Foundations of Software Engineering*, Zurich, Switzerland, September 1997. Verlag.
- [79] R. Madachy. System dynamics modeling of an inspection-based process. In IEEE Computer Society Press, editor, *Proceedings of the Eighteenth International Conference on Software Engineering*, Berlin, Germany, March 1996.
- [80] R. Madachy. Modeling software processes with system dynamics: Current developments. In *Proceedings of the 1996 International System Dynamics Conference*, Cambridge, MA, July 1996.
- [81] R. Madachy. Measuring inspections at litton. In *Proceedings of the Sixth International Conference on Applications of Software Measurement*, Orlando, FL, October 1995. Software Quality Engineering. Best Paper Award.
- [82] R. Madachy. Knowledge-based risk assessment and cost estimation. In *Proceedings of the Ninth Knowledge-Based Software Engineering Conference*, IEEE Computer Society Press, September 1994. Monterey, CA.

Moderately peer reviewed

- [83] M. Towhidnejad, T. Ferris, A. Squires, and R. Madachy. Enabling systems engineering program outcomes via systems engineering body of knowledge. In *2013 Conference on Systems Engineering Research, Procedia Computer Science*, 16, pages 983–989, 2013.
- [84] R. Turner, J. Lane, D. Ingold, and R. Madachy. A lean approach to improving se visibility in large operational systems evolution. volume 23, 2013.
- [85] T. Hilburn, A. Squires, and R. Madachy. A model for educating systems engineers. In *Proceedings of the IEEE Systems Conference*, Vancouver, Canada, March 2012. IEEE.
- [86] R. Turner, D. Ingold, J. Lane, R. Madachy, and D. Anderson. An event-driven, value-based, pull systems engineering scheduling approach. In *Proceedings of the IEEE Systems Conference*. Vancouver, March 2012.

- [87] R. Turner, D. Ingold, J. Lane, R. Madachy, and D. Anderson. Effectiveness of kanban approaches in systems engineering within rapid response environments. In *Proceedings of the 10th Annual Conference on Systems Engineering Research*, March 2012.
- [88] B. Boehm, J. Lane, and R. Madachy. Total ownership cost models for valuing system flexibility. In *2011 Conference on Systems Engineering Research*, Los Angeles, CA, April 2011.
- [89] R. Madachy and R. Valerdi. Automating systems engineering risk assessment. In *Proceedings of the 8th Annual Conference on Systems Engineering Research*, 2010.
- [90] H. Johnson and R. Madachy. Simulating international space station issue resolution. In *Proceedings of AIAA Space 2008 Conference*, Long Beach, CA, 2008.
- [91] R. Madachy, B. Haas, H. Bradbury-Huang, J. Newell, R. Vos, and M. Rahimi. Achieving sustainable development in southern california: Collaborative learning through system dynamics modeling. In *Proceedings of the 18th International Symposium of INCOSE*, Netherlands, 2008.
- [92] B. Boehm, D. Ingold, and R. Madachy. The macro risk model - an early warning tool for software-intensive systems projects. In *Proceedings of the 18th International Symposium of INCOSE*, Netherlands, 2008.
- [93] R. Madachy, B. Boehm, J. Richardson, M. Feather, and T. Menzies. Value-based design of software v&v processes for nasa flight projects. In *Proceedings of AIAA Space 2007 Conference*, Long Beach, CA, 2007.

Lightly peer reviewed

- [94] W. Rosa, R. Madachy, B. Boehm, B. Clark, C. Jones, J. McGarry, and J. Dean. Improved method for predicting software effort and schedule. In *Proceedings of the 2014 International Cost Estimating and Analysis Association (ICCEA) Conference*, 2014. Best Paper Award.
- [95] R. Madachy. Knowledge-based assistance for software cost estimation and project risk assessment. In *Litton Software Technology Management Conference*, Santa Barbara, CA, 1994. Best Paper Award.
- [96] R. Madachy. Case and hypertext integration issues. In *The Third Annual Teamworkers International User Group Conference*, San Diego, CA, March 1990.
- [97] R. Madachy, P. Dousette, and S. Sperling. Librascope case position. In *Advance Working Papers of Third International Workshop on CASE*. Imperial College, London, UK, July, 1989.

Conference Presentations

- [98] R. Madachy and R. Valerdi. Trustworthy AI for Cost Modeling via Deterministic Delegation and Smart Input Inference. In *Proceedings of 2025 International Boehm COCOMO Forum*, Virtual, November 2025.
- [99] R. Madachy, R. Longshore, and R. Bell,. Tutorial: Open Source System Modeling with Python and Generative AI. In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.
- [100] R. Madachy and R. Bell. Tutorial: Developing Custom LLMs for Systems Engineering. In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.
- [101] R. Madachy, R. Valerdi, G. Wang, B. Brown, and M. Wheaton. Panel: Cost Impacts of Generative AI in Systems Engineering Processes (Moderated by R. Madachy). In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.
- [102] R. Madachy, R. Bell, and R. Longshore. A Maturity and Cost Model for Systems Engineering with Generative AI. In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.
- [103] R. Bell, R. Longshore, and R. Madachy. Tailored Learning for Cost Modeling: An Open Source RAG-Based Tool. In *Proceedings of 2024 International Boehm COCOMO Forum*, Virtual, November 2024.
- [104] R. Madachy and R. Longshore. Tutorial: Open Source System Modeling with Python. In *Proceedings of the 34th International Symposium of INCOSE*, Dublin, Ireland, 2024.
- [105] R. Madachy, R. Longshore, and R. Bell. Systems and Software Engineering Cost Modeling of AI Assistance. In *Proceedings of the 34th International Symposium of INCOSE*, Dublin, Ireland, 2024.

- [106] R. Madachy. Keynote: Open Source Systems Modeling and Convergence with AI. In *Proceedings of the 2024 Boehm Center for Systems and Engineering Annual Research Review*, Virtual, April 2024.
- [107] R. Madachy, R. Bell, and R. Longshore. Factoring AI Assistance into Software and Systems Engineering Cost Models. In *Proceedings of 2023 International Boehm COCOMO Forum*, Virtual, November 2023.
- [108] R. Madachy. Introduction to PyML. In *Proceedings of the 2022 INCOSE San Diego Mini-Conference*, San Diego, CA, December 2022.
- [109] R. Madachy. Law System Use Case Modeling. In *Proceedings of the 2022 INCOSE San Diego Mini-Conference*, San Diego, CA, December 2022.
- [110] R. Madachy, and J. Green. Naval Combat System Product Line Economics. In *Proceedings of the 2019 INCOSE San Diego Mini-Conference*, San Diego, CA, November 2019.
- [111] R. Madachy, D. Jacques, K. Giammarco, and J. Green. Integrating System Architecture and Cost Models for Affordability Tradeoff Analysis. In *Proceedings of the 2019 INCOSE San Diego Mini-Conference*, San Diego, CA, November 2019.
- [112] R. Madachy, D. Jacques, K. Giammarco, and J. Green. Integrating System Architecture and Cost Models via Size Attributes. In *Proceedings of the 34th International Forum on COCOMO and Systems/Software Cost Modeling*, Washington, DC, October 2019.
- [113] R. Madachy, and J. Green. An MBSE Approach for System Product Line Architecture Modeling and Economic Analysis. In *Proceedings of the 2018 INCOSE San Diego Mini-Conference*, San Diego, CA, December 2018.
- [114] J. Simonetti, R. Gallerani, K. Giammarco, and R. Madachy. A Process Architecture Model for Cost Analysis of Agile Software Development Projects. In *Proceedings of the 33rd International Forum on COCOMO and Systems/Software Cost Modeling*, Washington, DC, November 2018.
- [115] R. Madachy, D. Jacques, K. Giammarco, and D. Edwards. Model-based systems engineering tradespace analysis with sysml and cosysmo. In *Proceedings of the 32nd International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2017.
- [116] W. Rosa, R. Madachy, B. Clark, and B. Boehm. Agile software development cost modeling for the us dod. In *Proceedings of the 32nd International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2017.
- [117] R. Madachy. Cost, schedule, and quality models and simulations. In *Proceedings of the 31st International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2016. Invited Presentation.
- [118] R. Madachy, K. Giammarco, D. Jacques, and D. Edwards. System cost modeling and sysml integration. In *Proceedings of the 31st International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2016.
- [119] M. Farah-Stapleton, R. Madachy, M. Auguston, and K. Giammarco. Executable architecture modeling. In *Proceedings of the 31st International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2016.
- [120] R. Madachy. Software maintainability metrics workshop. In *Proceedings of the 2016 International Software Engineering Research Network Meeting*, La Ciudad, Spain, September 2016.
- [121] R. Madachy. Software process dynamics. In *Proceedings of the 2016 Brazilian Function Point Users Group*, Sao Paulo, Brazil, August 2016. Invited Presentation.
- [122] W. Rosa, B. Boehm, R Madachy, and B. Clark. Early phase software cost and schedule estimation models. In *Proceedings of the 30th International Forum on COCOMO and Systems/Software Cost Modeling*, Washington, DC, November 2015.
- [123] B. Clark and Madachy R. COCOMO III Workshop. In *Proceedings of the 30th International Forum on COCOMO and Systems/Software Cost Modeling*, Washington, DC, November 2015.

- [124] M. Farah-Stapleton, R. Madachy, M. Auguston, and K. Giammarco. Resource analysis based on system architecture behavior. In *Proceedings of the 30th International Forum on COCOMO and Systems/Software Cost Modeling*, Washington, DC, November 2015.
- [125] Madachy R. and B. Clark. Software cost estimation metrics manual for defense systems. In *Proceedings of the USC CSSE Annual Research Review*, Los Angeles, CA, April 2015.
- [126] W. Rosa, B. Boehm, R. Madachy, and B Clark. Simple empirical software effort estimation model. In *Proceedings of the 29th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2014.
- [127] B. Clark and Madachy R. Software cost estimation metrics manual for defense systems. In *Proceedings of the 29th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, October 2014.
- [128] B. Boehm and R. Madachy. Workshop: Empirical specification and evaluation of the ilities. In *Proceedings of the 2013 International Software Engineering Research Network Meeting*, Baltimore, MD, 2013.
- [129] B. Clark and R. Madachy. Dod software resource data reports (srdrs) and cost data analysis workshop. In *Proceedings of the 27th International Forum on COCOMO and Systems/Software Cost Modeling*, Pittsburgh, PA, 2012.
- [130] R. Turner and R. Madachy. Improving systems engineering effectiveness using kanban-based scheduling and a service-oriented approach. In *Proceedings of IEEE SysCon*, Vancouver, Canada, March 2012. IEEE.
- [131] R. Madachy and R. Valerdi. Estimation curriculum development workshop. In *Proceedings of the 26th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2011.
- [132] B. Clark and R. Madachy. Air force estimation guidebook workshop. In *Proceedings of the 26th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2011.
- [133] B. Clark and R. Madachy. SRDR data analysis research workshop. In *Proceedings of the 25th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2010.
- [134] B. Clark and R. Madachy. Software metrics unification & software productivity domains workshop. In *Proceedings of the 24th International Forum on COCOMO and Systems/Software Cost Modeling*, Cambridge, MA, 2009.
- [135] W. Rosa, B. Boehm, B. Clark, R. Madachy, and J. Dean. Domain-driven software cost and schedule estimation models: Using software resource data reports. In *Proceedings of the 2013 International Cost Estimating and Analysis Association (ICCEA) Conference*, New Orleans, LA, 2013.
- [136] CSSE alumni panel. In *USC CSSE Annual Research Review*, Los Angeles, CA, March 2013.
- [137] W. Rosa, B. Boehm, B. Clark, T. Tan, and R. Madachy. Domain-driven software cost estimation: Space, air, ship, and ground systems. In *Proceedings of the 2012 SCEA/ISPA Joint Annual Conference and Training Workshop*, Orlando, FL, 2012.
- [138] B. Boehm, J. Lane, S. Koolmanojong, and R. Madachy. Estimating for lifecycle and product line affordability. In *Proceedings of the SCEA/ISPA Joint Annual Conference and Training Workshop*, Orlando, FL, 2012.
- [139] R. Madachy. Panel: Software process simulation - at a crossroads? . In *Proceedings of the 2012 International Conference on Software and System Process*, Zurich, Switzerland, 2012. IEEE. Invited Panelist.
- [140] B. Clark, R. Madachy, B. Boehm, and W. Rosa. Software cost estimation metrics manual online. In *Proceedings of the 28th International Forum on Software Cost Modeling*, Los Angeles, CA, 2013.
- [141] W. Rosa, B. Boehm, B. Clark, T. Tan, and R. Madachy. Domain-driven software cost estimation. In *Proceedings of the 27th International Forum on COCOMO and Systems/Software Cost Modeling*, Pittsburgh, PA, 2012.
- [142] R. Madachy, B. Boehm, B. Clark, T. Tan, and W. Rosa. Software cost estimation metrics manual. In *Proceedings of the 26th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2011.

- [143] B. Boehm, B. Clark, R. Madachy, W. Rosa, and T. Tan. Estimation challenges for 21st century software systems. In *Proceedings of the 2011 ISPA/SCEA Conference*, Albuquerque, NM, June 2011.
- [144] B. Boehm, J. Lane, and R. Madachy. Valuing system flexibility via total ownership cost analysis. In *13th Annual NDIA Systems Engineering Conference*, San Diego, CA, 2010.
- [145] R. Madachy, B. Boehm, E. Conrow, K. Nidiffer, and G. Roedler. Panel: Systems engineering management and the relationship of systems engineering to project management and software engineering. In *13th Annual NDIA Systems Engineering Conference*, San Diego, CA, 2010. Panelist.
- [146] R. Madachy. Coconomography. In *Proceedings of the 25th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2010. Invited Presentation.
- [147] R. Madachy and A. W. Brown. COCOMO suite toolset. In *Proceedings of the 25th International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2010.
- [148] B. Clark and R. Madachy. Building cost estimating relationships for acquisition decision support. In *14th Annual Practical Software and Systems Measurement (PSM) User's Group Conference*, 2010.
- [149] B. Boehm, R. Madachy, B. Clark, and W. Rosa. Future ground system software estimation and metrics. In *Proceedings of the 2010 Ground System Architectures Workshop (GSAW)*, Los Angeles, CA, 2010.
- [150] R. Madachy, B. Boehm, B. Clark, D. Reifer, and W. Rosa. A sizing framework for dod software cost analysis. In *Proceedings of the 24th International Forum on COCOMO and Systems/Software Cost Modeling*, Cambridge, MA, 2009.
- [151] R. Madachy. Integrated cocomo suite tool for education. In *Proceedings of the 24th International Forum on COCOMO and Systems/Software Cost Modeling*, Cambridge, MA, 2009.
- [152] R. Madachy and R. Valerdi. Risk analysis and mitigation with expert cosysmo. In *Proceedings of the 24th International Forum on COCOMO and Systems/Software Cost Modeling*, Cambridge, MA, 2009.
- [153] W. Rosa, B. Clark, R. Madachy, D. Reifer, and B. Boehm. Software cost metrics manual. In *Proceedings of the 42nd Department of Defense Cost Analysis Symposium*, Williamsburg, VA, 2009.
- [154] R. Madachy. COCOMO suite model unification tool. In *Proceedings of the 23rd International Forum on COCOMO and Systems/Software Cost Modeling*, CA, 2008. Los Angeles.
- [155] R. Madachy. Business valuation with software cost modeling - a case study. In *Proceedings of the 22nd International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2007.
- [156] R. Madachy and B. Boehm. Software cost model comparison for nasa projects. In *Proceedings of the 2007 NASA Cost Symposium*, Denver, CO, 2007.
- [157] R. Madachy and R. Valerdi. Expert COSYSMO. In *Proceedings of the 22nd International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2007.
- [158] R. Madachy and B. Boehm. ODC COQUALMO. In *Proceedings of the 22nd International Forum on COCOMO and Systems/Software Cost Modeling*, Los Angeles, CA, 2007.
- [159] J. Richardson, B. Boehm, R. Madachy, L. Huang, D. Port, and R. Kazman. Reducing autonomy risks through rational selection of verification strategies. In *Proceedings of 2006 Ground Systems Architecture Workshop*, Los Angeles, CA, 2006.
- [160] B. Boehm, L. Huang, and R. Madachy. Integrated software cost and quality modeling for program risk management. In *Proceedings of 2006 Ground Systems Architecture Workshop*, Los Angeles, CA, 2006.
- [161] R. Madachy. Applying gqm to software cost, schedule, and quality estimation. In *Proceedings of the Software Technology Conference 2004*, Salt Lake City, UT, 2004.
- [162] R. Madachy. A value-based software product model. In *Proceedings of the Eighteenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, 2003.

- [163] Y. Chen and R. Madachy. Results of eservices product sizing metric correlations. In *Proceedings of the Eighteenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 2003.
- [164] B. Boehm, Y. Yang, and R. Madachy. Coplino: A product-line investment analysis model. In *Proceedings of the Eighteenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 2003.
- [165] R. Madachy. Using cost models in software risk management. In *Proceedings of the Fourth Joint Annual International Society of Parametric Analysts/Society of Cost Estimating and Analysis International Conference*, Orlando, FL, June 2003.
- [166] R. Madachy. Software process concurrence modeling. In *Proceedings of the Fourth Joint Annual International Society of Parametric Analysts/Society of Cost Estimating and Analysis International Conference*, Orlando, FL, June 2003.
- [167] R. Madachy. Software process concurrence modeling. In *Proceedings of the Software Management/Applications of Software Measurement 2003 Conference*, San Jose, CA, June 2003.
- [168] R. Madachy. Tutorial: Use of cost models in risk management. In *Proceedings of the Seventeenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 2002.
- [169] D. Reifer and R. Madachy. COCOMO II/SEER rosetta stone. In *Proceedings of the Seventeenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, 2002.
- [170] R. Madachy. Software process concurrence. In *Proceedings of the 2002 International System Dynamics Conference*, Palermo, Italy, July 2002. System Dynamics Society.
- [171] R. Madachy. Software schedule analysis with process concurrence. In *Proceedings of the Sixteenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 2001.
- [172] R. Madachy and Cocomo Ii:. Airborne radar system example. In *Proceedings of the Fifteenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 2000.
- [173] D. Reifer and R. Madachy. An introduction to COCOMO II.2000 (tutorial). In *Proceedings of the Software Technology Conference Salt Lake City*, Salt Lake City, UT, 2000.
- [174] R. Madachy. Pal-enabled software metrics and process automation. In *Proceedings of the Litton Software Technology Management Conference*, Santa Barbara, CA, February 2000.
- [175] R. Madachy. Cost/schedule/process modeling via system dynamics. In *Proceedings of the Fourteenth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 1999.
- [176] R. Madachy and D. Tarbet. Initial experiences in software process modeling. In *Proceedings of the 14th International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 1999.
- [177] R. Madachy. An advanced process asset library. In *Proceedings of the Tenth Software Engineering Process Group Conference*, Atlanta, GA, March 1999.
- [178] R. Madachy. An advanced process asset library. In *Proceedings of the 1999 Litton Software Technology Management Conference*, Dana Point, CA, February 1999.
- [179] R. Madachy and Tutorial: System. Dynamics modeling applied to software development processes. In *Proceedings of ProSim 98 Workshop*, Silver Falls, OR, June 1998.
- [180] R. Madachy, R. Nakahara, and M. Cochran. An intranet-based software cost estimation tool. In *Proceedings of the Litton Software Technology Management Conference*, CA, February 1997. Santa Barbara.
- [181] R. Madachy. Tutorial: Process modeling with system dynamics. In *Conference on Software Process Improvement*, Irvine, CA, January 1997.
- [182] R. Madachy. Tutorial: Process modeling with system dynamics. In *Proceedings of the Eighth Software Engineering Process Group Conference*, Atlantic City, NJ, May 1996.

- [183] R. Madachy. System dynamics modeling of an inspection-based process. In *Proceedings of the Litton Software Technology Management Conference*, Santa Barbara, CA, April 1996.
- [184] R. Madachy. System dynamics and cocomo: Complementary modeling paradigms. In *Proceedings of the Tenth International Forum on COCOMO and Software Cost Modeling*, Pittsburgh, PA, October 1995. Software Engineering Institute.
- [185] R. Madachy. Process improvement analysis of a corporate inspection program. In *Proceedings of the Seventh Software Engineering Process Group Conference*, Boston, MA, May 1995.
- [186] R. Madachy. Process improvement analysis of a corporate inspection program. In *Proceedings of the 1995 Litton Software Technology Management Conference*, Newport Beach, CA, April 1995.
- [187] B. Boehm, B. Clark, E. Horowitz, C. Westland, R. Madachy, and R. Selby. Cost models for future software life cycle processes: COCOMO 2.0. In *Proceedings of the Eighth Annual Software Technology Conference*, Salt Lake City, UT, April 1995.
- [188] R. Madachy. Dynamic modeling of an inspection-based process. In *Proceedings of the 1995 California Software Symposium*, Irvine, CA, April 1995.
- [189] R. Madachy. Development of a cost estimation process. In *Proceedings of the Ninth International Forum on COCOMO and Software Cost Modeling*, Los Angeles, CA, October 1994.
- [190] R. Madachy and L. Little. Analysis of a successful inspection program. In *Proceedings of the Eighteenth Annual Software Engineering Workshop*, Goddard Space Flight Center, Greenbelt, MD, December 1993. NASA/SEL.
- [191] R. Madachy. Knowledge-based assistance for software cost estimation and project risk assessment. In *Proceedings of the Eighth International Forum on COCOMO and Software Cost Modeling*, Pittsburgh, PA, October 1993. Software Engineering Institute.

Other Technical Presentations

- [192] R. Madachy and R. Bell. Tutorial: Developing Custom LLMs for Systems Engineering. *INCOSE San Diego Chapter Tutorial*, July 2025.
- [193] Madachy R. Systems Engineering Maturity and Cost Modeling Framework for GenAI. *INCOSE San Diego Chapter Meeting*, June 2025.
- [194] R. Madachy and R. Longshore. Tutorial: Open Source System Modeling with Python. *INCOSE San Diego Chapter Tutorial*, June 2023.
- [195] Madachy R. New Effort and Schedule Models for Agile Processes in the DoD. *Wright Patterson Air Force Base (WPAFB) Cost-Info-Share Meeting*, February 2023.
- [196] R. Madachy, D. Jacques, K. Giammarco, and J. Green. Integrating System Architecture and Cost Models for Affordability Tradeoff Analysis. Systems Engineering Research Center Webinar, Virtual, November 2019.
- [197] Madachy R. and D. Jacques. System Cost Modeling and SysML Integration in Model-Based Systems Engineering. *INCOSE San Diego Chapter Meeting*, December 2016.
- [198] D. Jacques and R. Madachy. Model-Driven UAS ISR Tradespace Analysis. *8th Annual SERC Sponsor Research Review*, November 2016.
- [199] D. Jacques and R. Madachy. Model-Centric UAV ISR Analysis. *7th Annual SERC Sponsor Research Review*, December 2015.
- [200] R. Madachy. iTAP methods, processes and tools. *6th Annual SERC Sponsor Research Review*, December 2014.
- [201] R. Madachy. NPS Total Ownership Cost Models. *2014 SERC Annual Technical Review*, March 2014.
- [202] R. Madachy. Systems engineering management and the relationship of systems engineering to project management and software engineering. DoD ODASD Webinar Conference, July 2011. DoD Invited Presentation.

- [203] R. Madachy. Simulation of processes for developing complex systems. Crystal City, VA, 2011. DoD Schedule Assessment Workshop. DoD Invited Presentation.
- [204] Madachy R. Quick Engineering Cost Estimates and Trades using Coconomography. *INCOSE San Diego Chapter Meeting*, February 2011.
- [205] R. Madachy. Simulation of processes for complex software-intensive systems. DoD ODASD Webinar Conference, December 2008. DoD Invited Presentation.

Technical Reports

- [206] System Qualities Ontology, Tradespace and Affordability (SQOTA) Project - Phase 5. Technical Report SERC-2017-TR-105, Systems Engineering Research Center, April 2017.
- [207] System Qualities Ontology, Tradespace and Affordability (SQOTA) Project – Phase 4. Technical Report SERC-2016-TR-101, Systems Engineering Research Center, February 2016.
- [208] Tradespace and Affordability - Phase 3. Technical Report SERC-2014-TR-039-3, Systems Engineering Research Center, December 2014.
- [209] Tradespace and Affordability – Phase 2 A013 - Final Technical Report. Technical Report SERC-2013-TR-039-2, Systems Engineering Research Center, December 2013.
- [210] Tradespace and Affordability – Phase 1 A013 - Final Technical Report. Technical Report SERC-2013-TR-039-1, Systems Engineering Research Center, July 2013.
- [211] B. Boehm, J. Lane, T. Tan, M. Moazeni, R. Madachy, and W. Rosa. Software Intensive Systems Cost and Schedule Estimation, Final. Technical Report SERC-2013-TR-032-2, Systems Engineering Research Center, June 2013.
- [212] Code L01 NSWC PHD, L Department. Littoral Warfare Engineering Facility (LWEF) Business Case Analysis. Technical report, 2013.
- [213] RT18 - Valuing Flexibility Phase II. Technical Report SERC-2012-TR-10-2, Systems Engineering Research Center, 2012.
- [214] R. Turner, R. Madachy, J. Lane, D. Ingold, and L. Levine. Agile-Lean Software Engineering (ALSE) Evaluating Kanban in Systems Engineering, A013 - Final. Technical Report SERC-2013-TR-022-2, Systems Engineering Research Center, 2013.
- [215] RT 6 – Software Intensive Systems Data Quality and Estimation Research in Support of Future Defense Cost Analysis, A013 - Annual and Final Scientific Technical Report . Technical Report SERC-2012-TR-032, Systems Engineering Research Center, 2012.
- [216] R. Madachy and B. Boehm. Comparative Analysis of COCOMO II, SEER-SEM and True-S Software Cost Models. Technical report, University of Southern California, USC-CSSE, 2008.
- [217] R. Madachy. Risk Model Report and Demonstrations. Technical report, submitted to NASA AMES, 2007.
- [218] R. Madachy and B. Boehm. Detailed Plans for CY 2008: Software Risk Advisory Tools Enhancements. Technical report, submitted to NASA AMES, 2007.
- [219] D. Ingold and R. Madachy. NASA Macro Risk Model Detailed Case Study. Technical report, submitted to NASA AMES, 2007.
- [220] R. Madachy and B. Boehm. Detailed ODC COQUALMO and Accuracy Analysis. Technical report, submitted to NASA AMES, 2007.
- [221] R. Madachy and B. Boehm. Calibration of ODC COQUALMO to Predict V&V Effectiveness. Technical report, submitted to NASA AMES, 2007.
- [222] R. Madachy. Continuous Risk Model Design, Implementation and Calibration. Technical report, submitted to NASA AMES, 2007.

- [223] R. Madachy. 6G Software Cost and Defect Data Collection Form. Technical report, submitted to NASA AMES, 2006.
- [224] R. Madachy. Cost Model Comparison Report, Update Version. Technical report, submitted to NASA AMES, 2006.
- [225] R. Madachy, B. Boehm, and D. Wu. Comparison and Assessment of Cost Models for NASA Flight Projects. Technical Report USC-CSE-2006-616, University of Southern California, 2006.
- [226] R. Madachy. JPL Delphi Survey for V&V Defect Detection Efficiencies. Technical report, submitted to NASA JPL, 2006.
- [227] D. Ingold and R. Madachy. Risk Model Calibration Report. Technical report, submitted to NASA AMES, 2006.
- [228] R. Madachy. Model Comparison Report. Technical report, submitted to NASA AMES, July 2006.
- [229] R. Madachy and B. Boehm. MOCA Final Report. Technical report, submitted to the NASA/USRA MOCA project, March 2006.
- [230] R. Madachy. Using ODC COQUALMO to Quantify Risk Exposure for AUTONOMO: Approach and Example. Technical report, submitted to the NASA/USRA MOCA project, 2005.
- [231] R. Madachy and. MOCA Autonomo Calibration White Paper. Technical report, submitted to the NASA/USRA MOCA project, September 2005.
- [232] R. Madachy. Incremental COCOMO II and Initial System-of-Systems Common Operating Environment (SOSCOE) Sensitivity Analysis. Technical report, submitted to the Army/DARPA Future Combat Systems (FCS), 2005.
- [233] R. Madachy. Defect Field Descriptions Supporting the High Dependability Computing Program. Technical report, submitted to NASA-JPL, August 2005.
- [234] B. Boehm, L. Huang, A. Jain, and R. Madachy. The Nature of Information System Dependability: A Stakeholder/Value Approach. Technical Report USC-CSE-2004-520, University of Southern California, 2004.
- [235] R. Madachy. Incremental COCOMO II and Initial SOSCOE Sensitivity Analysis. Technical report, submitted to Boeing for the Army/DARPA Future Combat Systems (FCS), 2004.
- [236] R. Madachy. FCS Software Cost and Schedule Data Collection. Technical report, prepared for contractors on the Army Future Combat Systems (FCS), 2002.
- [237] R. Madachy and B. Boehm. MDS software adoption cost analysis. Technical report, submitted to NASA-JPL, 2002.
- [238] R. Madachy, D. Reifer, and B. Boehm. FCS software cost estimation initiative plan. Technical report, submitted to Boeing for the Army/DARPA Future Combat Systems (FCS), 2002.
- [239] R. Madachy. FCS COCOMO tutorial. Technical report, Army/DARPA Future Combat Systems (FCS) project, Seal Beach, CA, August 2002.
- [240] R. Madachy. COCOMO to SEER Rosetta Stone. Technical report, submitted to Army/DARPA Future Combat Systems (FCS), 2002.

Published Computer Programs

- [241] R. Madachy. COSYSMO with AI Usage, 2025. URL https://softwarecost.org/tools/COSYSMO_AI/.
- [242] R. Madachy, and others. se-lib: Systems Engineering Library (Python package), 2023–2025. URL <https://pypi.org/project/se-lib/>, <https://github.com/se-lib/se-lib>.
- [243] R. Madachy. Electric Car Charging Model. In *What Every Engineer Should Know About Modeling and Simulation*, August 2017. URL <https://github.com/madachy/What-Every-Engineer-Should-Know-About-Modeling-and-Simulation>.

- [244] R. Madachy. System Cost Model Suite v.2.0, 2017 – 2022. URL http://csse.usc.edu/tools/cost_model_suite.
- [245] R. Madachy. COCOMO Suite, 2015 – 2017. URL <http://csse.usc.edu/tools/COCOMOSuite>.
- [246] R. Madachy. COCOMO II, 2006 - 2025. URL <https://softwarecost.org/tools/COCOMO/>.
- [247] R. Madachy. COCOMO 81, 2016. URL <https://softwarecost.org/tools/COCOMO81/>.
- [248] R. Madachy. COSYSMO, 2011 - 2025. URL <https://softwarecost.org/tools/COSYSMO/>.
- [249] R. Madachy. Expert COSYSMO, 2011. URL <http://csse.usc.edu/tools/expertcosysmo.php>.
- [250] R. Madachy. ODC COQUALMO, 2011. URL <http://csse.usc.edu/tools/COQUALMO.php>.
- [251] R. Madachy. Expert COCOMO, 2008. URL http://sunset.usc.edu/research/COCOMOII/expert_cocomo/expert_cocomo2000.html.

Other Publications

Newsletter Articles

- [252] R. Madachy. From the President. INCOSE San Diego Chapter Newsletter, March 2016. URL <https://sdincose.org/wp-content/uploads/2016/10/March20201620SD20INCOSE20Newsletter.pdf>. (From the President Column).
- [253] R. Madachy. Our INCOSE Heritage: Foundations of Systems Architecting. INCOSE San Diego Chapter Newsletter, June 2016. URL <https://sdincose.org/wp-content/uploads/2017/08/June-2016-INCOSE-Newsletter.pdf>. (From the President Column).
- [254] R. Madachy. Our INCOSE Heritage: Integrating Software and Systems Engineering. INCOSE San Diego Chapter Newsletter, September 2016. URL <https://sdincose.org/wp-content/uploads/2016/10/Sept20201620INCOSE20Newsletter.pdf>. (From the President Column).
- [255] R. Madachy. Our INCOSE Heritage: Systems Engineering Dichotomies. INCOSE San Diego Chapter Newsletter, December 2016. URL <https://sdincose.org/wp-content/uploads/2017/01/Dec20201620INCOSE20Newsletter.pdf>. (From the President Column).

Sponsored Research

"System Dynamics Modeling Course and Capstone Project", Air Force Research Laboratories (AFRL), PI, \$130,750 2024 - 2025, \$174,961 2025 - 2026

"Systems and Software Engineering Cost Modeling of AI Assistance", Naval Research Program (NRP), PI, \$150,000 2024 - 2026

"Optimize the Military and Civilian Workforce With Respect to Both Cost and Readiness", Marine Corps Air Station (MCAS) Miramar, \$160,000 FY2023

"Open Source System Modeling Library", Naval Postgraduate School Foundation, PI, \$10,000 FY2022

"DoD Agile Software Development Early Phase Cost Modeling", Naval Research Program (NRP), PI, \$55,000 FY2018

"System Qualities Ontology, Tradespace And Affordability Program", Office of the Deputy Assistant Secretary of Defense for Systems Engineering (ODASD(SE)), PI, \$30,000 FY2015-FY2016 ((Phase 4 Task 2); \$30,000 FY2015-FY2016 ((Phase 4 Task 3) \$38,400 FY2016-FY2017 (Phase 5) \$38,400 FY2017-FY2018 (Phase 6) (8 awards including Phases 1-3 below, total \$276,400)

"Ilities Tradespace And Affordability Program", Office of the Deputy Assistant Secretary of Defense for Systems Engineering (ODASD(SE)), PI, \$40,000 FY2013 (Phase 1); \$30,000 FY2013-FY2014 (Phase 2); \$30,000 FY2014-FY2015 ((Phase 3 Task 2); \$30,000 FY2014-FY2015 (Phase 3 Task 3)

“Software Cost Estimation Metrics”, Air Force Cost Analysis Agency, PI, \$75,000 for 2009–2010, \$65,000 for 2010–2011, \$25,000 FY2011; \$15,000 FY2011–FY2012 (4 awards, total \$180,000)

PMS-485 ”Systems And Software Support”, SPAWAR, PI, \$12,000, FY2012

SPAWAR PMS 485 Support, SPAWAR, Co-PI, \$27,000 FY2011

“Systems Of Systems Cost Estimating Support to SPAWAR 5.1.1”, Space and Naval Warfare Systems Command, PI, \$29,750 for FY2011

”Future Airborne Capability Environment (FACE) Business Model Development”, NAVAIR, PI, \$104,000 FY2014–FY2015

”Littoral Warfare Engineering Facility Business Case Analysis”, Naval Surface Warfare Center, PI, Port Hueneme Division, \$32,500 FY2013–FY2014

”Agile-Lean Software Engineering (ALSE): Evaluating Kanban In Systems Engineering”, National Security Agency, \$120,000 FY2012, Co-PI at \$40,000 FY2012

”Valuing Flexibility”, Office of the Deputy Assistant Secretary of Defense for Systems Engineering (ODASD), PI, \$100,000 (2010-2011), Co-PI, \$11K FY2011)

“Future Directions in Software Development Practices”, National Aeronautics and Space Administration / West Virginia University, Co-PI, \$40,000 for 2008

“Army Future Combat Systems Support”, Sverdrup Technology, Inc., Co-PI, \$450,000 for 2006–2007, \$419,000 extension for 2008

“Software Risk Advisory Tools”, National Aeronautics and Space Administration, Co-PI, \$396,000 for 2006–2008

“System Dynamics Modeling for Sustainable Enterprise Executive Roundtable”, USC Center for Sustainable Cities, PI, \$5,000 M&S for 2008

“A Model of Options and Costs for Reliable Autonomy”, National Aeronautics and Space Administration, Human and Robotic Technology Program, Co-PI, \$384,375 for 2005–2006 for the USC portion

“Prometheus Software Tool Evaluation”, Northrop Grumman Space Technology, \$80,000, Co-PI, 2005

“Empirical Research on High Dependability Computing”, National Aeronautics and Space Administration, Co-PI, total contract value \$2,198,872, funded 2001–2004

“CEBASE Support of Future Combat Systems”, Army and DARPA, Research Lead, total contract values of \$3,161,49 funded 2001-2004 and \$566,452 funded 2002–2004

“Teledyne Software Cost Model Development”, Teledyne Systems, Research Lead, \$40,000, 1994

University Service

Academic Associate, Systems Engineering Curriculum 311, 2015 - Present

Course Coordinator, SE4003 Software Systems Engineering, Systems Engineering Dept., 2008 - Present

Course Coordinator, SE3011 Engineering Economics and Cost Estimation, Systems Engineering Dept., 2017-Present

Chair, NPS Faculty Council Scholarship Committee, 2017

Committee Member, NPS Faculty Council Scholarship Committee, 2016

Committee Member, Systems Engineering Dept. Hiring Committee, March 2016 - December 2016, 2017

Committee Member, Software Engineering (SWE) Ph.D. Committee, 2009 - Present

Honors and Awards

Best Paper Award, IEEE Empirical Software Engineering and Measurement Conference, 2017

Recipient, [2016 Lifetime Achievement Award in Systems and Software Cost Estimation](#), USC Center for Systems and Software Engineering, for “Innovative Development of a Wide Variety of Cost, Schedule and Quality Models and Simulations”, 2016

Best Paper Award, International Cost Estimating and Analysis Association Conference, 2015

Best Paper Award, International Cost Estimating and Analysis Association Conference, 2014

Biography listed in the Marquis Who’s Who as an engineering educator at NPS, 2009

Nomination from Litton Guidance and Control Systems Division VP for corporate-wide Litton Software Excellence Award, 1999 (award decision pending when left company)

Honorable Mention, Litton Advanced Technology Achievement Award (all Litton divisions), 1996

Best Paper Award, Sixth International Conference on Applications of Software Measurement, 1995

Co-recipient, Litton Data Systems Continuous Measurable Improvement major award, 1995

Best Paper Award, Litton Software Technology Management Conference (all Litton divisions), 1994

Best Graduate Student Paper Award, Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 1988

First Place Winner, 1988 UCLA Crump Prize for research in medical engineering from Crump Institute for Medical Engineering, 1988

Received General Dynamics Excel Award for generation of mission data and on-board tape for advanced flight test program, 1982

First Place Winner, national technical paper contest sponsored by Gearhart Industries, 1981

Chosen twice to represent the University of Dayton in “Who’s Who Among Students in American Universities and Colleges”, 1980, 1981

Dean’s Honor List, University of Dayton, 1977–1981

Tau Beta Pi National Engineering Honor Society, 1978

Pi Tau Sigma National Mechanical Engineering Honor Society, 1978

Professional Service

Professional Organization Board

Vice-President of Technical Development, INCOSE San Diego Chapter, 2019

Vice-President of Chapter Development, INCOSE San Diego Chapter, 2018

Past-President, INCOSE San Diego Chapter, 2017

President, INCOSE San Diego Chapter, 2016

President-Elect, INCOSE San Diego Chapter, 2015

Treasurer, INCOSE San Diego Chapter, 2014

Journal Editorial Boards

Editorial Board, [Journal of Cost Analysis and Parametrics \(JCAP\)](#), 2012 – 2017

Editorial Board, International Journal of Information Technology and the Systems Approach, 2007-2009

Journal Referee and Reviewer

Systems Engineering, 2020, 2025 (SYS-25-069)
System Dynamics Review, 2017 (SDR-17-0015)
Journal of Software: Evolution and Process, 2017 (JSME-16-0191)
IEEE Transactions on Software Engineering, 2009, 2010, 2011, 2014, 2023 – 2024 (TSE-2023-12-0618, TSE-2014-34-0054, TSE-2012-04-0093, TSE-2011-03-0066, TSE-2009-12-0406)
IEEE Systems Journal, 2013 (ISJ-RE-13-02596)
IEEE Software, 2009
Empirical Software Engineering, 2010, 2014 (EMSE-D-14-00093, EMSE430 2010)
Journal of Software Maintenance and Evolution: Research and Practice, 2009
Journal of Cost Analysis and Parametrics, 2013 (UCAP-2013-0001)
ACM Transactions on Software Engineering and Methodology, 2011 (TOSEM-2011-0093).
Information and Software Technology, 2010, 2014 (INFOSOF-D-10-00109, INFOSOF-D-13-0044)
International Journal of Computer Integrated Manufacturing, 2009 (TCIM-2010-IJCIM-0105)
International Journal of Information Technologies and Systems Approach, 2009
Previous reviews for IEEE Transactions on Software Engineering, IEEE Software, IEEE Computer, Journal of Software: Evolution and Process, Journal of Systems and Software, System Dynamics Review, others, 1996-2008

Conference Chairmanship

Program Co-Chair, International Conference on Software Process (ICSP), 2009
Publicity Chair, International Conference on Software Process (ICSP), 2008
Registration Chair, International Symposium on Empirical Software Engineering (ISESE), 2004
Program Chair, International Forum on COCOMO and Systems/Software Cost Modeling, 1998-2001

Conference Program Committee Membership

Program Committee Member, International Conference on Systems and Software Process (ICSSP), 2011–2015, 2017
Program Committee Member, Conference on Systems Engineering Research (CSER), 2012–2015
Program Committee Member, Actionable Analytics Workshop at IEEE Automated Software Engineering (ASE), 2015
Program Committee Member, International Forum on COCOMO and Systems/Software Cost Modeling, 1994–Present
Program Committee Member, International Conference on Software Process (ICSP), 2007–2010
Program Committee Member, Software Process Simulation Modeling Workshop, 1998–2000, 2003, 2005–2006
Program Committee Member, International Symposium on Empirical Software Engineering (ISESE), 2004
Program Committee Member, International Conference on COTS-Based Software Systems (ICCBSS), 2004
Program Committee Member, Feedback and Evolution in Software and Business Processes (FEAST) Workshop, 2000
Program Committee Member, California Software Symposium, 1997–1999

Conference - Other

Reviewer for several papers submitted to the Barry W. Boehm Symposium, 2011

Reviewed conference papers for Engineering Education and Educational Technologies (EEET 2010), 2010

Conference Tutorials Organized

R. Madachy, R. Longshore, and R. Bell,. Tutorial: Open Source System Modeling with Python and Generative AI. In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.

R. Madachy and R. Bell. Tutorial: Developing Custom LLMs for Systems Engineering. In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.

R. Madachy and R. Longshore. Tutorial: Open Source System Modeling with Python. In *Proceedings of the 34th International Symposium of INCOSE*, Dublin, Ireland, 2025.

D. Houston and R. Madachy, "Tutorial: Understanding the Dynamics of Software Projects: An Introduction to Software Process Modeling and Simulation", Proceedings of the 2014 International Conference on Software and System Process, IEEE, Nanjing, China, 2014

R. Madachy and R. Valerdi, "Tutorial: Systems Engineering and Total Ownership Cost Estimation", Proceedings of the 22nd Annual INCOSE International Symposium, Rome, Italy, July 2012

Workshops and Panels Organized

R. Madachy, R. Valerdi, , G. Wang, B. Brown, and M. Wheaton. Panel: Cost Impacts of Generative AI in Systems Engineering Processes (Moderated by R. Madachy). In *Proceedings of the 35th International Symposium of INCOSE*, Ottawa, Canada, 2025.

B. Clark and R. Madachy, "COCOMO III workshop", Proceedings of the 30th International Forum on COCOMO and Systems/Software Cost Modeling, Washington, DC, November 2015

B. Boehm and R. Madachy, "Workshop: Empirical Specification and Evaluation of the Ilities", Proceedings of the 2013 International Software Engineering Research Network Meeting, Baltimore, MD, 2013

B. Clark, R. Madachy, "DoD Software Resource Data Reports (SRDRs) and Cost Data Analysis Workshop", Proceedings of the 27th International Forum on COCOMO and Systems/Software Cost Modeling, Pittsburgh, PA, 2012

R. Turner, R. Madachy, "Improving Systems Engineering Effectiveness Using Kanban-based Scheduling and a Service-oriented Approach", Proceedings of IEEE SysCon, March 2012

R. Madachy and R. Valerdi, "Estimation Curriculum Development Workshop", Proceedings of the 26th International Forum on COCOMO and Systems/Software Cost Modeling, Los Angeles, CA, 2011

B. Clark and R. Madachy, "Air Force Estimation Guidebook Workshop", Proceedings of the 26th International Forum on COCOMO and Systems/Software Cost Modeling, Los Angeles, CA, 2011

B. Clark and R. Madachy, "SRDR Data Analysis Research Workshop", Proceedings of the 25th International Forum on COCOMO and Systems/Software Cost Modeling, Los Angeles, CA, 2010

B. Clark and R. Madachy, "Software Metrics Unification & Software Productivity Domains", Proceedings of the 24th International Forum on COCOMO and Systems/Software Cost Modeling, Cambridge, MA, 2009

R. Madachy, "Panel: Systems Engineering Management and the Relationship of Systems Engineering to Project Management and Software Engineering", 13th Annual NDIA Systems Engineering Conference, 2010

R. Madachy, "Panel: Comparisons of Estimation Tools for Next-Generation Processes" at the 23rd International Forum on COCOMO and Systems/Software Cost Modeling, 2008

R. Madachy, R. Valerdi, "Expert COSYSMO Workshop", 24th International Forum on COCOMO and Systems/Software Cost Modeling, 2009

Other Professional Service

Representing NPS for the International Software Engineering Research Network (ISERN), 2008 – Present

Co-chairman of Los Angeles Software Process Improvement Network steering committee 1996–1998

Professional Organizations

Institute of Electronic and Electrical Engineers (IEEE) (Senior Member)

International Council on Systems Engineering (INCOSE)

Association for Computing Machinery (ACM)

American Institute of Aeronautics and Astronautics AIAA (lapsed)

Expert Witness and Litigation Service

United States v. Huawei Technologies

United States District Court for the Eastern District of New York, Court Case No. 1:18-cr-00457, 2023

Republican Party of New Mexico v. Tolouse Oliver New Mexico District Court, Class Action Suit, Court Case No. D-506-CV-202200041, 2023

Voterlabs, Inc. v. Ethos Groups Consulting Services, LLC

United States District Court for the District of Delaware, Case No. 19-524-RGA, 2020

EPES Software, Inc. v. Seed Technologies

Tulsa County District Court, Case No. CJ-2011-4574, 2015-2016

Ticket Innovations, Inc. v. Ticketmaster

Los Angeles County Superior Court, Case No. BC 327228, 2008

Business to Business Markets, Inc. (B2B) v. Kshema Technologies Ltd.

Los Angeles County Superior Court, Case No. BC280932, 2009-2010

Can-Auto Inspections Inc. and Can-Auto Services Inc. v. Vascor, Ltd.

S.C.B.C Action No. S-073725, Vancouver Registry, 2010