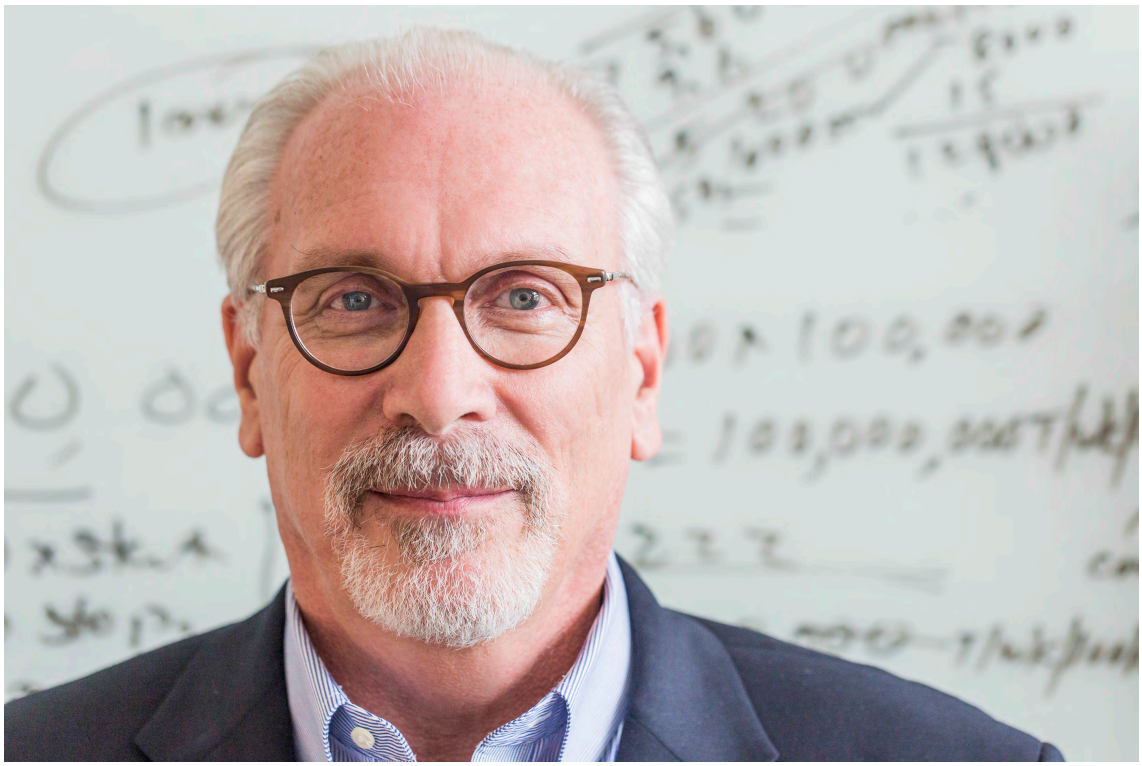


Professor Richard A. DeMillo
Professor and Executive Director, Center for 21st Century Univeristies
Georgia Institute of Technology
USA

Georgia Institute of Technology
Office of the President

December 13, 2017

Consejo Cultural Mundial
Ms. Gabriela Monter
Medellín 201, 1st Floor
Col. Roma
C.P. 06700
México, D.F.

Dear Selection Committee:

With great pleasure, on behalf of the Georgia Institute of Technology, I submit the nomination of Dr. Richard DeMillo for the José Vasconcelos World Award of Education. Dr. DeMillo is a rare educator whose contributions in all three areas of interest to the award committee and to the betterment of society make him a unique candidate for the Vasconcelos Award. He holds an endowed chair in computer science and has achieved international acclaim in his discipline not only for his technical contributions but also for his educational innovations. He is an authority on teaching. His contributions in this area are documented in two award-winning books published by MIT Press on the intersection of technology and education and his frequent speaking engagements to audiences ranging from international meetings on education to the cabinets of university presidents and boards of trustees. Finally, he has become a dominant figure on the American scene when it comes to visionary leadership in educational policy and practice. He is the founder and executive director of the Center for 21st Century Universities, cited by the Lumina Foundation as a "unique institution" for driving change in higher education. Closer to home, he leads the Commission for Creating the Next in Education, the ambitious multi-year task force aimed at reimagining university education in the year 2040, an effort that will surely influence educational strategy at technological universities around the world for generations to come.

Dr. DeMillo brings unique background and perspective to his role as an educational innovator. He came to Georgia Tech from industry, where he was Chief Technology Officer at Hewlett—Packard, and he brings a pragmatic style of leadership to innovation that emphasizes measurable, practical changes to how universities operate. Infusing this energy into educational innovation has been one of his enduring contributions. Systemic achievements like those I will cite below are often the domain of college presidents, so it is all the more remarkable that Dr. DeMillo has not been (and as far as I know does not aspire to be) president of a university. In a recent essay on academic leadership in the digital era, he credits Buckminster Fuller with inspiring his approach to innovation: find small projects which, if they are successful, will grow exponentially and eventually make obsolete the old way of doing things. Dr. DeMillo brings a strong intellectual and moral commitment to the role that public universities play in higher education. Access and affordability of high quality post-secondary education is a consistent theme in his work. Ambassador Andrew Young's inspiring Foreword to Dr. DeMillo's recent book "Revolution in Higher Education," makes the case that his commitment is in line with the best traditions of human and civil rights in the United States. The individuals who have written in support of this nomination prominently mention that Dr. DeMillo's contributions have inspired future leaders in education to improve society.

Georgia Institute of Technology
Atlanta, Georgia 30332-0325 U.S.A.
PHONE 404-894-5051
FAX 404-894-1277

I would like to elaborate specifically on these contributions that I believe qualify him for the Vasconcelos Award.

Innovative Curricula.

Dr. DeMillo joined the faculty at Georgia Tech as Dean of the College of Computing in 2002. He was already an acclaimed computer scientist, a fellow of both the American Association for the Advancement of Science and the Association for Computing Machinery, and the author of more than one hundred articles, books and patents. At the time Dr. DeMillo became dean, American Computer Science was a discipline in decline. Enrollments were dropping, diversity (particularly women in computing) was declining, and employers reported widespread dissatisfaction with undergraduate education in computing. Dr. DeMillo led the development of a curriculum called "Threads" which was specifically designed to address these problems. The Georgia Tech Threads curriculum is a widely admired and much-imitated approach to undergraduate engineering education that intertwines broad sets of horizontal skills called Threads. A unique combination of flexibility and depth, Threads incorporates over 80 distinct undergraduate experiences under a single, highly ranked degree that equips students with technical and leadership skills for an increasingly competitive world. Threads produces graduates who are better equipped to combine skills for designing, inventing, and problem-solving. Thomas Friedman, writing about Threads in his 2005 book "The World is Flat," said "What the Georgia Tech model recognizes is that the world is increasingly going to be operating of the flat-world platform, with its tools for all kinds of horizontal collaboration. So [other] schools had better make sure they are embedding these tools and concept into the education process." Threads was not only instrumental in reversing the downward spiral in computing at Georgia Tech, it became a national and international model. Leaders at major computer science departments attest to the influence that Threads had on their programs. Robert Constable of Cornell University describes the impact on his institution: "At Cornell I discussed the Threads idea with colleagues and eventually Cornell created a "vectors" base major [based on] the Georgia Tech program. I think that what then Dean DeMillo and his colleagues accomplished at Georgia Tech inspired many computer scientists to think more carefully about education in their field." This sentiment was also expressed by MIT Chancellor Eric Grimson: "[Georgia Tech] opened up the possibility of better linking computational thinking to other domains." The development of Threads inspired his 2011 book "Abelard to Apple: The Fate of American Colleges and Universities," that helped spark a national discussion of the role that technology plays in improving education.

Visionary Approach to Educational Innovation

Largely because he has achievements in academia, industry, and government, Dr. DeMillo has been able to bring a deep understanding of both human and technological change to the problem of renewing higher education in the 21st century. While most thinkers focused on the role that technology can play in delivering educational content at lower costs, Dr. DeMillo focused on the potential of technology for enhancing human interaction. When he founded the Center for 21st Century Universities at Georgia Tech in 2011, it was with the idea that the Center would be Georgia Tech's "living laboratory for fundamental change," in higher education. Advancing a vision of educational innovation based on "small bands of innovators" who cluster together to advance new outcomes was a revolutionary idea (and one that he documented in his 2015 book "Revolution in Higher Education: How a Small Band of Innovators Will Make College Accessible and Affordable). It is based not on disrupting education with technological innovation but rather causing change to occur based on cultural innovation. In his letter of support, President Crow describes this as visionary and "different from 99 percent of the literature" on innovation. Lumina Foundation President Merisotis mentions in his letter of support "Rich's indelible impact on Lumina Foundation and on post-secondary education in the United States." This was recognized with Lumina's naming of

Dr. DeMillo as inaugural Lumina Foundation Fellow in 2012.

We at Georgia Tech have put to good use Dr. DeMillo's ability to envision the future of higher education and to clearly articulate a path for achieving that future by asking him to co-lead an effort we call the Commission on Creating the Next in Education. The Commission consists of more than 50 individuals who, over a two-year period, were tasked with imagining the future of education just beyond the strategic horizon and recommend ways for moving the Institute toward that Future. We believe this to be the most ambitious project of its kind. The Commission's report will certainly be a roadmap for us but also for the many institutions around the world that look to Georgia Tech for leadership among technological universities. In recognition of this, The Times Higher Education Summit has invited Dr. DeMillo to speak to 200 leaders of emerging institutions around the world about this approach to innovation. In practical terms, this approach to innovation has been transformational to the Institute. For example, it has accelerated our digital learning strategies in ways I will describe below. Beyond that, however, it has been important in building and sustaining the culture of innovation at Georgia Tech. From its beginnings as an idea in the mind of Dr. DeMillo as a former Dean to its current status as the innovation hub for the university, and by extension to the University System of Georgia and beyond, it is this vision that has been key to his success. As President Crow states in his letter, "this is the exemplar path for what a futurist in educational technology and educational outcomes should be."

Fundamental Change in Higher Education

When Dr. DeMillo published his 2011 book "Abelard to Apple," very few people at Georgia Tech (or around the country) were aware of the impending development of Internet based education. He was among the first to recognize the importance of new information technologies. As edX President Anant Agarwal noted in his letter "Dr. DeMillo asks the right questions and points the ship in the direction of discovery, agility and innovation." In this way, his impact extends well beyond the campus of Georgia Tech to institutions around the world. The Center for 21st Century Universities negotiated agreements to produce and distribute Massive Open Online Courses (MOOCs) in 2012 and became among the first in the world to provide such materials. This was a fundamental change in business and education models for Georgia Tech. As president of Georgia Tech, I have relied on Dr. DeMillo to help craft the institutional strategy in this area. When it came time to present this proposal to the Regents of the University System of Georgia, he was by my side. Courses were developed using private funds and when they were launched in summer of 2012, the enrollments grew quickly. Today almost 2.5 million students are enrolled in Georgia Tech's online courses. The next step was to work with academic leadership to identify a traditional degree program that would benefit from this technology. The success of these offerings led directly to an agreement with Zvi Galil, the current Dean of Computing, to develop and offer an online version of the already successful Masters in Computer Science degree program at an affordable price. The $6,700 OMSCS degree was launched in 2013 to much acclaim around the world. As of today, there are about 7,000 enrolled in the OMSCS degree program. That represents a 20% increase in total enrollment at Georgia Tech with essentially no impact on the size of Georgia Tech's faculty, a productivity improvement that was predicted by Dr. DeMillo in his books. The national impact of this program has been studied by researchers at the Harvard Kennedy School of Government. The OMSCS degree has increased the U.S. capacity for graduate education in computer science by nearly 10% per year, a level that has significant implications for national competitiveness. Dr. DeMillo went on to help form a second MOOC-based degree in Data Analytics. Like Computer Science, this program was also offered to expand access to higher education at a similar price. Along the way, he helped pioneer stackable credentials through the edX system. These kinds of changes have a large impact on institutions, causing a re-evaluation of every aspect of Georgia Tech's business models and forecasts for future growth.

Throughout Dr. DeMillo's work there is a strong commitment to the special role that public universities play in the United States. As he describes in "Revolution in Higher Education," the social contract between universities and the citizens who support them is an important consideration in assessing the effects of change. Do universities effectively teach what they promise to teach? Do they produce informed citizens? Are they important to the state, region and nation? Are they accessible and affordable to the broadest range of citizens? Do they reach into every home and family to improve life? These questions concern him. The Georgia Tech model, as Thomas Friedman refers to it, is to structure demonstrations of how these positive goals can be achieved. For example, the research surrounding Georgia Tech's OMSCS program is actually an experiment that demonstrates simultaneous quality and productivity improvement, something that has long been debated but never conclusively demonstrated before.

The impact of this work will be felt by institutions around the world seeking ways to innovate. From conceptualizing change to communicating the value to society of improved learning to designing pilot projects and experiments to demonstrate the ideas, his approach to innovation has taken hold and has led many institutions to imitate it. For Georgia Tech, his contributions are immediate and enduring. I am pleased to be able to nominate Dr. Richard DeMillo for the José Vasconcelos World Award.

Sincerely,

G. P. "Bud" Peterson
President

Lumina FOUNDATION

December 15, 2017

President Bud Peterson
Georgia Institute of Technology

Re: Dr. Richard DeMillo

Dear Bud:

I understand that you are nominating Dr. Richard DeMillo for the Jose Vasconcelos World Education Award. I was pleased to hear this and wanted to take the opportunity to share a little bit about Rich's indelible impact on Lumina Foundation and on postsecondary education in the United States.

When Lumina decided to launch a fellowship program in 2012, Rich was among the first names on our list. We wanted his eyes (and brain) on our emerging strategic plan, which focused on experimentation and innovative delivery. As we challenged ourselves to envision what a truly student-centered, technology-driven system looked like, Rich provided invaluable guidance. We looked to Rich's work with Threads—still a model for undergraduate education that strives to put the student first and prioritize learning over time—and his leadership in developing three new schools, seven new programs and four additional computer science programs. We knew he understood how to seek efficient delivery without sacrificing quality. He knew how to spur systems change without alienating faculty. He knew how to prepare students for an increasingly specialized 21st Century workforce without leaving them with a myopic world view.

Similarly, years later we turned to Rich as we crafted our 2017-2020 plan, seeking his counsel on how to translate lessons from technology-enabled and self-paced learning into success for non-traditional providers like the military or employers. His storied tech career at Bellcore and Hewlett-Packard gives him such a balanced view, with a healthy respect for, both, academia and the "real world." He is an invaluable critical friend and resource, but is especially well-equipped for conversations about future forces in education and the workforce.

Rich DeMillo laid the groundwork – and the gauntlet – for any educator striving to leverage technology and still put students first. His work as an innovator, educator, scientist, and author has been a true gift to the field.

It is my pleasure to enthusiastically recommend him for the Jose Vasconcelos World Education Award.

Sincerely,

Jamie P. Merisotis
President and CEO
Lumina Foundation

ARIZONA STATE UNIVERSITY

December 14, 2017

Dr. Bud Peterson
President
Georgia Institute of Technology
225 North Avenue
Atlanta, GA 30332

Dear Bud:

I am writing in support of the nomination of Dr. Rich DeMillo for the José Vasconcelos World Award of Education. I find the structure of the award and its criteria a close match with Dr. DeMillo's overall contribution to the general field of education.

Specifically, Dr. DeMillo has been a dominant thought leader completely focused on the future of education by working to understand how one takes the philosophy of Western education and the broader philosophies of education and development from a broad range of cultures and move them into a technological realm. The basic complexity here is the technological realm and movement toward it. This requires a deep understanding and appreciation of human and technological change.

Through his work in the private sector advancing technologies for enhanced human interaction through advanced information technology to his work associated with understanding the complexities of integrating technology into the overall educational process, Dr. DeMillo has outlined the pathway for us to move forward through his substantial work in practice, theory and in general communication. He has advanced low cost globally-scaled educational opportunities in computer science and he has worked to understand the progress and trajectory of American colleges and universities through his book ***Abelard to Apple: The Fate of American Colleges and Universities***. He serves and has served at a very intriguing interface between technology and learning but not in the typical sense. The interface where Dr. DeMillo sits is an interface of trying to find a way to understand how the interface between knowledge creation, knowledge synthesis, knowledge storage, knowledge transfer and technologically enhanced knowledge transfer can all occur together and be available to all, anywhere and at any time.

In particular, Dr. DeMillo has focused on the process of innovation within the sector and the means by which the sector itself can advance. Through his book on revolution and higher education, he has identified the method for advancement in higher education being, in fact, a method wherein small bands of innovators cluster together to advance new methodological outcomes. The key to this is the fact that this is a process different than 99 percent of the

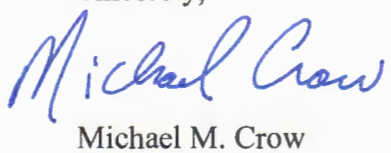
OFFICE OF THE PRESIDENT
FULTON CENTER 410, 300 E. UNIVERSITY DRIVE
PO BOX 877705 TEMPE, AZ 85287-7705
(480) 965-5253 FAX: (480) 965-0865
HTTP://PRESIDENT.ASU.EDU

literature articulates for innovation which is a process of disruption. This is a process of cultural innovation as opposed to technological innovation and Dr. DeMillo both understands this and articulates it immensely well. This then establishes a new path forward that has a higher chance of success.

Starting as a scientist and then moving through normal academic positions and then on into corporate positions, Dr. DeMillo has provided the exemplar path for what a futurist in educational technology and educational outcomes should be and will need to be going forward.

I recommend Dr. Rich DeMillo for the José Vasconcelos World Award of Education without reservation. Thank you for your serious consideration of his nomination and please don't hesitate to let me know if I can provide you with any further information regarding his qualifications.

Sincerely,



Michael M. Crow
President

Resume
Richard A. DeMillo

Richard DeMillo is the Charlotte B. and Roger C. Warren Professor of Computing and Professor of Management at Georgia Tech. He founded and directs the Center for 21st Century Universities, Georgia Tech's living laboratory for fundamental change in higher education. He was named Lumina Foundation Fellow in recognition of his work in higher education.

He was formerly the John P. Imlay Dean of Computing at Georgia Tech where he led the design and implementation of the Threads program. His 2011 MIT Press book "**Abelard to Apple: The Fate of American Colleges and Universities**," which helped spark the national discussion of the future of higher education, was inspired by this experience. A sequel entitled "**Revolution in Higher Education: How a Small Band of Innovators will make College Accessible and Affordable**" was published by MIT Press in 2015 and was named best education book of 2015 by the National Publisher's Association.

Prior to joining Georgia Tech, he was Hewlett-Packard's Chief Technology Officer. He led HP through technology revolutions in super computing, printing, open source software, information security, and nanotechnology. He was Vice President for Applied Research at Bellcore, where he oversaw computing research that led to many of the e-commerce technologies that are used around the world today. DeMillo was also an executive at the National Science Foundation, where he directed the Computer and Computation Research Division. He directed the Software Test and Evaluation Project, which rewrote policy for software-intensive systems, for the Secretary of Defense during the Reagan administration. He directed Georgia Tech's Information Security Center, and served as an election observer for the Carter Center. He has served on boards of public and private cybersecurity and privacy companies, including RSA Security and SecureWorks

The author of over a hundred articles, books, and patents, his research contributions include fundamental work in computer security, cryptography, software engineering, and theoretical computer science. He is co-inventor of the field of Differential Fault Analysis (DFA), a cryptanalysis technique that has been applied to many cryptosystems. DFA and the field that has grown around it has led to changes in security standards. He is a Fellow of both the Association for the Advancement of Science and the Association for Computing Machinery.

A distinguished scholar and educator, Dr. DeMillo is nominated for the Jose Vasconcelos for pioneering a unique approach to educational innovation that combines cultural change and adaptation of traditional western models of post-secondary education with moral and economic values that benefit all of society. He has been a visionary leader whose work advocates for the kind of fundamental change in higher education that expands access, reduces cost, and enhances the quality of educational experiences. He is specifically being honored for founding the Center for 21st Century Universities, a unique institution aimed at experimenting with and implementing educational innovations that better position higher education to succeed in a world being rapidly transformed by technological, social, and political change. He is a dominant thought leader completely focused on the future of education. Through his work and the work of the Center, Georgia Tech, Lumina Foundation, and the many other institutions of higher education have been indelibly transformed to bring the benefits of post-secondary education to millions of new students.

Curriculum Vita: Richard A. DeMillo

Present Position

Georgia Institute of Technology, Atlanta GA 30332
Charlotte B. and Roger C. Warren Professor of Computing
Professor of Management,
Executive Director, Center for 21st Century Universities

Education

- BA, Mathematics, 1969, College of St. Thomas, St. Paul Minnesota
- Ph.D., Information and Computer Science, 1972, Georgia Institute of Technology, Atlanta, Georgia

Professional Experience

2015-Present	Charlotte B. and Roger C. Warren Professor of Computing Executive Director, Center for 21st Century Universities Georgia Institute of Technology Atlanta, GA 30332
2013-2014	Distinguished Chief Scientist Qatar Computing Research Institute Qatar Foundation Doha, Qatar
2002-Present (On Leave 2013-2014)	Professor of Management John P. Imlay Dean of Computing (2002-2009) Director, Georgia Tech Information Security Center (2002-2004) Georgia Institute of Technology Atlanta, Georgia 30332
2000-2002	Chief Technology Officer Vice President Hewlett-Packard Company 3000 Hanover Street Palo Alto, CA 94303
2000	General Manager Internet Systems Group Telcordia Technologies (Formerly Bellcore) 445 South Street Morristown, NJ 07960
1994-2000	Vice President and General Manager Information and Computer Sciences Research Telcordia Technologies (Formerly Bellcore) 445 South Street Morristown, NJ 07960
1994	Visiting Professor Department of Electronics and Informatics University of Padua Padua, Italy
1989-91	Director Computer and Computation Research Division National Science Foundation 1800 G Street NW Washington, DC
1987-96	Professor of Computer Science and Director Software Engineering Research Center Purdue University West Lafayette, Indiana
1985-87	Director Software Engineering Research Center Georgia Institute of Technology Atlanta, Georgia

1984-87	Assistant Director for Research School of Information and Computer Science Georgia Institute of Technology Atlanta, Georgia
1981-87	Professor of Information and Computer Science School of Information and Computer Science Georgia Institute of Technology Atlanta, Georgia
1976-81	Associate Professor of Information and Computer Science School of Information and Computer Science Georgia Institute of Technology Atlanta, Georgia
1972-76	Assistant Professor Department of Electrical Engineering and Computer Science University of Wisconsin, Milwaukee Milwaukee, Wisconsin
1969-72	Research and Teaching Assistant School of Information and Computer Science Georgia Institute of Technology Atlanta, Georgia
1969-71	Research Assistant Los Alamos National Laboratory Los Alamos, New Mexico

Research and Consulting Experience

Dr. DeMillo has been a consultant to many major corporations and other organizations. Detailed descriptions of recent consultantships are available upon request:

Board Memberships

Dr. DeMillo has been a board member and director of many public and private corporations, foundations and philanthropic organizations. Detailed descriptions of recent board memberships are available upon request:

Professional Recognition

ANAK, Outstanding Faculty Award (2106)

American Publishers Association Best Book Award (Education, 2016)

Inaugural Fellow of the Lumina Foundation

Fellow of the Association for Computing Machinery

Fellow of the American Association for the Advancement of Science

Panels and Advisory Positions

1983: Secretary of Defense Blue Ribbon Panel (The Eastman Panel) to Define the Software Engineering Institute (SEI)

1983-1985: IBM Software Tools Advisory Board

1984: Congressional Office of Technology Assessment Panel on Research Directions in Software Engineering.

1987: National Research Council Committee on Computer Security

1993-1996: National Research Council committee on Statistical Methods in Software Engineering

1992-1993: FAA VSCS Independent Fault Analysis Team

1995: National Research Council committee on Commercial Software Practices in Defense Software

1995-2000: Princeton University Computer Science Advisory Committee

1998-2000: Advisory Board of the College of Computing, Georgia Tech

2000-3: Georgia Tech Advisory Board

2001-2005: Advisory Board of the Johns Hopkins University Computer Sciences Department

2003-2005: National Research Council Committee on Telecommunications Research

2004-2005: National Research Council Committee on Network Science and the Army's Future Needs

2005 Defense Science Board Committee on Security of Software

2010-2013 Strategic Advisory Committee (Chair) Qatar Computing Research Institute

2012 AMA Advisory Board on Medical Education

2012-2016 World Economic Forum Global Action Council on the Future of Universities

2012-2015 Pacific Northwest National Laboratories National Security Advisory Council

2012-2016 Western Governors University Advisory Board

2013-2016 Singapore Institute of Technology and Design Advisory Board

2015 IEEE Computer Society, Research Advisory Board

Editorships

1990-96 Series Editor, *Software Science and Systems*, Plenum Publishing Company

1989-96 Editorial Board, *ACM Transactions on Software Engineering and Methods*

1988-94 Editorial Board, *IEEE Transactions on Software Engineering*

1985-87 Editorial Board, *Information and Control*

1982-85 Editorial Board, *ACM Transactions on Mathematical Software*

Professional Societies

- Association for Computing Machinery
- American Mathematical Society
- Mathematical Association of America
- Society for Industrial and Applied Mathematics
- American Association for the Advancement of Science
- Association for Symbolic Logic
- IEEE

Dr. DeMillo has served on numerous program committees for professional meetings. In addition, Rich has served as Chairman or Program Chairman for the following annual conferences

- 15th International Conference on Software Engineering, 1993
- ACM SIGSOFT Annual Symposium, 1989 (Testing, Analysis and Verification)
- ACM Computer Science Conference, 1988
- ACM Symposium on Theory of Computing, 1984
- NSIA Conference on Test and Evaluation, 1983
- ACM Symposium on Principles of Programming Languages, 1982
- First IEEE Symposium on Security and Privacy, 1981

1. Revolution in Higher Education: How Small Band of Innovators Will Make College Accessible and Affordable, MIT Press, 2015
2. Abelard to Apple: The Fate of American Colleges and Universities, MIT Press, 2011
3. Richard A. DeMillo, "Unbundling Higher Education and the Georgia Tech Online M.S. in Computer Science: A Chronicle," in *MOOCs and Open Education Around the World* (edited by Curtis J. Bonk, Mimi Miyoung Lee, Thomas C. Reeves, and Thomas Reynolds) Routledge, 2015.
4. Rafael L. Bras and Richard A. DeMillo, "The Leadership Challenges for Higher Education's Digital Future," in *Challenges in Higher Education Leadership: Practical and Scholarly Solutions,* (edited by James Soto Anthony, Ana Marie Cauce, and Donna Shalala), Routeledge, 2017
5. Richard A. DeMillo, "Keeping Technology Promises," *Communications of the ACM*, November 2012 (Volume 55, No. 11): 37-40.
6. R. A. DeMillo, R. J. Lipton and A. J. Perlis, "Social Processes and Proofs of Theorems and Programs", *Communications of the ACM*, Vol. 22, No. 5 (May 1979) pp. 271-280. [See also correspondence in "ACM Forum", *Communications of the ACM*, vol. 22, No. 11 (November 1979); an earlier version of this paper was published in the proceedings of the *6th ACM Symposium on Principles of Programming Languages* (January 1977) Santa Monica, California, pp. 245-262; This paper has been reprinted under the same title many times. It has appeared in *The Mathematical Intelligencer*, January, 1981, the 1984 anthology *Mathematics: People Problems, Results*, edited by D. C. Campbell and J. C. Higgins, published by Wadsworth International, the 1987 anthology *Currents in the Philosophy of Mathematics* edited by Thomas Tomasczko, the 1998 revised version which appeared under the title *New Directions in the Philosophy of* and the 1993 anthology *Program Verification*,
7. D. Boneh, R. A. DeMillo and R. J. Lipton, "On the Importance of Eliminating Errors in Cryptographic Computations, *Journal of Cryptography 14 (2001) 2, 101-119.* See main entry [115]. This paper has been cited many times. It resulted in a revision to the Open SSL Toolkit (rev 0.9.7) requiring a check of the RSA-CRT result
8. D. Boneh, R. DeMillo and R. Lipton , "Method of using transient faults to verify the security of a cryptosystem" , Patent Number 6,965,67
9. R. A. DeMillo, R. J. Lipton and F. G. Sayward, "Hints on Test Data Selection: Help for the Practicing Programmer", *Computer*, Vol. 11, No. 4 (April, 1978) pp. 34-43. This paper has been reprinted several times under the same title. It has also appeared in Tutorial*: Software Testing and Validation Techniques* edited by Edward Miller and William Howden, IEEE Computer Society Press (1981).
10. R. A. DeMillo, N. A. Lynch, M. J. Merritt, "Cryptographic Protocols", *Proceedings, 14th ACM Symposium on Theory of Computing*, May, 1982, pp. 383-400.

Publications of Richard A. DeMillo

Books

- R. A. DeMillo, *An Education without Measure: Teaching and Learning the Science of Everyday Thinking, to be published 2018*
- R. A. DeMillo, *Revolution in Higher Education: How A Small Band of Innovators Will Make College Accessible and Affordable*, MIT Press 2015 (foreword by Amb. Andrew J. Young)
- R. A. DeMillo, *Abelard to Apple: The Fate of American Colleges and Universities,* MIT Press, 2011.
- R. A. DeMillo and J. R. Rice, Editors, *Studies in Computer Science*, Plenum Press 1994
- R. A. DeMillo, W. M. McCracken, R. J. Martin, J. F. Passafiume, *Software Testing and Evaluation*, The Benjamin-Cummings Publishing Company, Inc. 1986.
- G. I. Davida, R. A. DeMillo, D. P Dobkin, M. A. Harrison, R. J. Lipton, *Applied Cryptology, Cryptographic Protocols, and Computer Security*, American Mathematical Society (Applied Mathematics Series), 1984, American Mathematical Society. (Also: Indonesian edition, translated by Pangeran Sianipar, 1994)
- R. A. DeMillo, D. P. Dobkin, A. K. Jones, and R. J. Lipton, Editors, *Foundations of Secure Computation*, Academic Press, 1978

Special Publications

- "Statistics and Software Engineering", National Academy of Sciences, National Research Council Committee on Statistics, Document Number, 1996, Washington, DC.
- "Report of the Voice Switching and Control System (VSCS) Independent Fault Tolerance Analysis Team (VIFTAT)," A Report to the Federal Aviation Administration, MITRE Report (January, 1993).
- "Computer and Information Security in the Department of Energy's Classified Environment" (U), National Academy of Sciences, National Research Council Committee on Computer Security Doc. No. 88-EEB-2, 1988, Washington, DC (Classified Report)
- R. A. DeMillo, "Operational Readiness of the Patriot Air Defense System Software"(U), Report to Director Operational Test and Evaluation, USDRE, 1985 (Classified Report)
- R. A. DeMillo, "Software Test and Evaluation Manual: Volume 1, Guidelines for the Treatment of Software in Test and Evaluation Master Plans", Sept., 1984. Issued by the Office of the Secretary of Defense as Attachment to Department of Defense Directive 5000.3 ("Test and Evaluation") DoDD 5000.3-M-3.
- "Software Testing", *Encyclopedia of Information and Computer Science, 3rd Edition*, Anthony Ralston
- "Observing the 2006 Presidential Elections in Venezuela: Final Report of the Technical Mission," The Carter Center, 2007
- "New Ecosystems in Higher Education and What They Mean for Accreditation and Assessment, in WASC Concept Papers, 2nd Series: The Changing Ecology of Higher Education and its Impact on Accreditation, March 2013, Western Association of Schools and Colleges, Accrediting Commission for Senior Colleges and Universities.
- "Governance for a New Era: A Blueprint for Higher Education Trustees," Project on Governance for a New Era, Benno Schmidt, Chairman, August 2014

Patents

D. Boneh, R. DeMillo and R. Lipton , "Method of using transient faults to verify the security of a cryptosystem" , Patent Number 6,965,673

Invited Talks, Keynotes

Dr. DeMillo is a frequent speaker at conferences and events. Details are available upon request

Papers and Book Chapters

1. J. Gough and R. A. DeMillo, "Towards an Ostensive Grammar I" *Eighth Annual Meeting of the Association for Computational Linguistics* (July 1970), Columbus, Ohio.
2. R. A. DeMillo, "An Application of an Ostensive Grammar to the Analysis of Existential Predicates", *Proceedings of the Southeastern Conference on Linguistics* (October 1970), Atlanta, Georgia.
3. L. Chiaraviglio and R. A. DeMillo, "On the Applicative Nature of Assignment", Georgia Institute of Technology Report Number GIT-ICS-71-1 (1971).
4. R. A. DeMillo, *Formal Semantics and the Logical Structure of Programming Languages,* Ph.D. Thesis, 1972, Georgia Institute of Technology, Atlanta, Georgia.
5. R. A. DeMillo, "Parallelism and Non-Determinism in the Lattice of Programs", *Record of the Computer Science Conference,* (February 1973), Columbus, Ohio.
6. R. A. DeMillo, "Constructing and Verifying Courses of Action in Robots," *Proceedings of MSAC-73,* (February 1973), Milwaukee, Wisconsin.
7. R. A. DeMillo and R. A. Northouse, "Autonomous Computing: Perspectives and Models for Artificial Intelligence," *Proceedings MSAC-74,* (February 1974), Milwaukee, Wisconsin.
8. R. A. DeMillo and K. Vairavan, "Parallel Scheduling of Programs in a Restricted Model of Computation", *Proceedings Sixth ACM Symposium on Theory of Computing,* (May 1974), Seattle, Washington.
9. R. A. DeMillo, "A Lattice Theoretic Interpretation of a Theorem by Patil," University of Wisconsin-Milwaukee Technical Report No. 75-6 (1975)
10. R. A. DeMillo, S. C. Eisenstat and R. J. Lipton, "The Complexity of Control and Data Structures", *Proceedings Seventh Annual Symposium on Theory of Computing*, Albuquerque, New Mexico (May 1975), pp. 186-193.
11. R. A. DeMillo, S. Amoroso and M. Wolfe, "Primitives for Tactical Real-Time Control Languages based on Simula 67 II: Design and Implementation Considerations", CENTAC Report No. 58, US Army Electronics Command, Fort Monmouth, NJ (1975).
12. R. A. DeMillo, S. Amoroso and M. Wolfe, "Primitives for Tactical Real-Time Control Languages based on Simula 67 I: General Language Considerations", CENTAC Report No. 50, US Army Electronics Command, Fort Monmouth, NJ (1975).
13. R. A. DeMillo, "Nondefinability of Certain Semantic Properties of Programs", *Notre Dame Journal of Formal Logic*, Vol. 16, No. 4, (1975), pp. 583-590.
14. R. A. DeMillo, S. C. Eisenstat and R. J. Lipton, "Space-Time Tradeoffs in Structured Programming", *Proceedings 1976 Johns Hopkins Conference on Information Systems and Sciences*, Baltimore, Maryland, (March, 1976), pp. 240-245.
15. R. A. DeMillo, S. C. Eisenstat and R. J. Lipton, "Programming Language Studies I: The Power of Control and Data Structures" University of Wisconsin-Milwaukee Technical Report No. 76-13 (1976)
16. R. A. DeMillo, S. C. Eisenstat and R. J. Lipton, "Can Structured Programs be Efficient", *SIGPLAN Notices*, Vol. 11, No. 10, (October, 1976), pp. 10-18.
17. R. A. DeMillo, S. C. Eisenstat and R. J. Lipton, "Space and Time Hierarchies for Classes of Control and Data Structures", *Journal of the ACM*, Vol. 23, No. 4 (October, 1976), pp. 720-730.
18. R. A. DeMillo, S. C. Eisenstat, and R. J. Lipton, "Space-Time Tradeoffis in Structured Programming: Reducible Flowgraphs (Abstract Only), Computer Science Conference, 1976.

19. K. Vairavan and R. A. DeMillo, "On the Computational Complexity of a Generalized Scheduling Problem", *IEEE Transactions on Computers*, Vol. C-25, No. 10 (October, 1976), pp. 720-732. This paper has been reprinted under the same title in *Distributed Computing: Concepts and Implementations*, edited by Paul McEntire, John G. O'Reilly and Robert E. Larsen, published by IEEE Press (1984).

20. R. A. DeMillo, R. J. Lipton and A. J. Perlis, "Social Processes and Proofs of Theorems and Program", *6th ACM Symposium on Principles of Programming Languages* (January 1977) Santa Monica, California, pp. 245-262 [See main entry number [40] below].

21. R. A. DeMillo, K. Vairavan and E. Sycara-Cyranski, "A Study of Schedules as Models of Parallel Computation", *Journal of the ACM*, Vol. 24, No. 4 (October, 1977), pp. 544-565.

22. R. A. DeMillo, "Some Applications of Model Theory to the Metatheory of Program Schemata", *Notre Dame Journal of Formal Logic",* Vol. 18, No. 3, 1977, pp. 489-495.

23. R. A. DeMillo, S. C. Eisenstat, and R. J. Lipton, "Preserving Average Proximity in Arrays" *Communications of the ACM",* Vol. 23, No. 3, (March 1978), pp. 228-230.

24. R. A. DeMillo and R. J. Lipton, "A Constructive Generalization of the Borel-Cantelli Lemma with Applications to the Complexity of Infinite Strings", *Mathematical System Theory",* Vol, 13, 1979, pp. 95-104.

25. R. A. DeMillo, D. P. Dobkin and R. J. Lipton, "Combinatorial Inference", *Proceedings 1977 Allerton Conference on Communication, Control and Computing* [Also appears in R. DeMillo et al (editors), *Foundations of Secure Computation*, Academic Press, 1978, pp. 27-38.

26. R. A. DeMillo, D. P. Dobkin and R. J. Lipton, "Even Data Bases that Lie can be Compromised", *IEEE Transactions on Software Engineering",* Vol SE-4, No. 1 (January, 1978), pp. 71-74.

27. B. H. Barnes, G. I. Davida, R. A. DeMillo, L. H. Landweber, H. Stone, "Theory in the Computer Science and Engineering Curriculum", *IEEE Computer",* Vol. 18, No. 12 (December, 1977), pp. 106-108.

28. R. A. DeMillo, R. J. Lipton and L. G. McNeil, "Proprietary Software Protection" in R. A. DeMillo et al (editors), *Foundations of Secure Computation",* Academic Press, 1978, pp. 115-132.

29. R. A. DeMillo and D. P. Dobkin, "Foundations of Secure Computation", in R. A. DeMillo et al (editors), *Foundations of Secure Computation",* Academic Press, 1978, pp. 1-3.

30. R. A. DeMillo, S. C. Eisentat and R. J. Lipton, "On Small Universal Data Structures and Related Combinatorial Problems", *Proceedings 1978 Johns Hopkins Conference on Information Systems and Sciences",* March, 1978, Baltimore, Maryland, pp. 416-428.

31. R. A. DeMillo, R. J. Lipton and F. G. Sayward, "Program Mutation as a Tool for Managing Software Development", *Proceedings of the 32nd Annual Meeting of the American Society for Quality Control",* May 1978, Chicago, Illinois, pp. 326-348.

32. T. A. Budd, R. A. DeMillo, R. J. Lipton, and F. G. Sayward, "The Design of a Prototype Mutation System for Program Testing", *Proceedings 1978 National Computer Conference",* pp. 623-627.

33. R. A. DeMillo and R. J. Lipton, "A Probabilistic Remark on Algebraic Program Testing", *Information Processing Letters*, Vol. 7, No. 4 (June, 1978) pp. 193-195.

34. R. A. DeMillo, R. J. Lipton and F. G. Sayward, "Discussion of Software Testing Issues", in P. Wegner (editor) *Research Directions in Software Technology*", MIT Press (1978) pp. 408-413.

35. R. A. DeMillo, R. J. Lipton and F. G. Sayward, "Hints on Test Data Selection: Help for the Practicing Programmer", *Computer*, Vol. 11, No. 4 (April, 1978) pp. 34-43. This paper has been reprinted several times under the same title. It has recently appeared in Tutorial*: Software Testing and Validation Techniques* edited by Edward Miller and William Howden, IEEE Computer Society Press (1981).

36. R. A. DeMillo, R. J. Lipton and A. J. Perlis, "Response to Dijkstra's On a Political Pamphlet from the Middle Ages", *Software Engineering Notes*, Vol. 3, No. 2 (April, 1978) pp. 16-17.

37. R. A. DeMillo, R. J. Lipton and F. G. Sayward, "Program Mutation: A New Approach to Program Testing", in E. F. Miller (editor) *Software Testing, Volume 2: Invited Papers,* Infotech International, 1979, pp. 107-128. [Volume 1 on this work contains helpful analysis and bibliography].

38. R. A. DeMillo and R. E. Miller, "Implicit Computation by Synchronization Primitives", *Information Processing Letters,* Vol. 9, No. 1 (20 July 1979) pp. 35-38.

39. R. A. DeMillo and D. P. Dobkin, "Recent Progress in Secure Computation", *Proceedings 1978 IEEE COMPSAC* (November 1978) Chicago, Illinois.

40. R. A. DeMillo and R. J. Lipton, "Some Connections between Computational Complexity and Mathematical Logic", *Proceedings 11th ACM Symposium on Theory of Computing* (May 1979) Atlanta, Georgia, pp. 153-159.

41. R. A. DeMillo, R. J. Lipton and A. J. Perlis, "Social Processes and Proofs of Theorems and Program", *Communications of the ACM*, Vol. 22, No. 5 (May 1979) pp. 271-280. [See also correspondence in "ACM Forum", *Communications of the ACM*, vol. 22, No. 11 (November 1979); an earlier version of this paper was published in the proceedings of the *6th ACM Symposium on Principles of Programming Languages* (January 1977) Santa Monica, California, pp. 245-262; This paper has been reprinted under the same title many times. It has appeared in *The Mathematical Intelligencer*, January, 1981, the 1984 anthology *Mathematics: People Problems, Results*, edited by D. C. Campbell and J. C. Higgins, published by Wadsworth International, the 1987 anthology *Currents in the Philosophy of Mathematics* edited by Thomas Tomasczko, the 1998 revised version which appeared under the title *New Directions in the Philosophy of* and the 1993 anthology *Program Verification*, edited by Timothy R. Colburn, James H. Fetzer and Terry L. Rankin, published by Kluwer Academic Publishers.

42. R. A. DeMillo, S. C. Eisenstat and R. J. Lipton, "Space-Time Tradeoffs in Structured Programming: An Improved Combinatorial Embedding Theorem", *Journal of the ACM*, Vol. 27, No. 1 (January, 1980) pp. 123-127.

43. R. A. DeMillo and R. J. Lipton, "The Consistency of P=NP and Related Problems with Fragments of Number Theory", *Proceedings 12th ACM Symposium on Theory of Computing* (May 1980) Los Angeles, California, pp. 45-57.

44. R. A. DeMillo, "New Approaches to Program Testing", *IEEE Computer*, Vol. 12, No. 3 (March 1979) pp. 105-106.

45. R. A. DeMillo, "Data Base Security" in Issues *in Data Base Management,* H. Weber and A. Wasserman (eds.), North-Holland 1979, pp. 253-256.

46. R. A. DeMillo, R. J. Lipton and R. E. Miller, "Stochastic Synchronization," 1981 *Johns Hopkins Conference on Computer Systems and Sciences*, March 1981.

47. G. I. Davida, R. A. DeMillo, R. J. Lipton, "Sharing Cryptographic Keys," *Proceedings 1980 IEEE Symposium on Security and Privacy*, April 1980, Berkeley, California.

48. R. A. DeMillo and R. J. Lipton, "A System Architecture to Support A Verifiably Secure Multilevel Security System," *Proceedings 1980 IEEE Symposium on Security and Privacy*, April 1980, Berkeley, California.

49. T. A. Budd, R. A. DeMillo, R. J. Lipton and F. G. Sayward, "Theoretical and Empirical Results in Program Testing," *Proceedings Ninth ACM Symposium Principles of Programming Languages*, Las Vegas, Nev., January 1980, pp. 181-196.

50. R. A. DeMillo and F. G. Sayward, "Statistical Measures of Software Reliability," *Software Metrics*, edited by F.G. Sayward et al, MIT Press, 1981, pp. 185-202.

51. R. A. DeMillo and R. J. Lipton, "Software Project Forecasting," *Software Metrics*, edited by F.G. Sayward, et. al., MIT Press, 1981, pp. 77-94.

52. R. A. DeMillo, "Cryptographic Protocols," Presented at Meeting of American Mathematical Society, *Proceedings of Symposia in Applied Mathematics* (1981).

53. G. I. Davida, R. A. DeMillo and R. J. Lipton, "Achieving Secure Computers Through Distributed Computing", *Proceedings Third International Conference on Distributed Computing*, Paris, April 1981.

54. R. A. DeMillo, "Validating Computer Software: Two Views" *Transactions of the 1980 Annual Meeting of the American Nuclear Society*, Washington DC, November, 1980, pp. 251-252 (Invited Paper).

55. R. A. DeMillo, R. J. Lipton, and A. J. Perlis, "Social Processes and Proofs of Theorems and Programs," The *Mathematical Intelligencer*, January 1981. *Reprinted. See main entry number [39]*

56. R. A. DeMillo, N. A. Lynch, M. J. Merritt, "Cryptographic Protocols", *Proceedings, 14th ACM Symposium on Theory of Computing*, May, 1982, pp. 383-400.

57. R. A. DeMillo and M. J. Merritt, "Protocols for Data Security," *IEEE Computer*, Volume 16, Number 2, (February 1983), pp. 39-54

58. R. A. DeMillo and R. J. Martin, "Software Test and Evaluation Project: A Status Report", *NSIA National Conference on Software Test and Evaluation*, February 1-3, 1983, Washington, DC, pp. T1-T10

59. R. A. DeMillo, "Requirements for a Test and Evaluation Subenvironment of an Advanced Software Engineering Environment" Prepared by the Software Test and Evaluation Project, under Contract Number F33657-82-G-2083 to the Georgia Institute of Technology, Atlanta, Georgia 30332, April 1984

60. R. A. DeMillo, A. B. Marmor-Squires, S. T. Redwine, Jr., W. E. Riddle, "Software Engineering Environments for Mission Critical Applications - STARS Alternative Programmatic Approaches", IDA Paper #P-1788. Prepared for Office of the Under Secretary of Defense for Research and Engineering by Institute for Defense Analyses, August 1984

61. R. A. DeMillo, "Volume 2 - Software Test and Evaluation: State-of-the-Art Overview" OSD/DDT&E Software Test and Evaluation Project, Phases I and II, Final Report, submitted to the Office of the Secretary of Defense, Director Defense Test and Evaluation and the Office of the Naval Research ONR Contract Number N00014-79-C-0231, June 1983

62. R. A. DeMillo, R. J. Martin, "Volume 1 - Report and Recommendations" OSD/DDT&E Software Test and Evaluation Project, Phases I and II, Final Report, submitted to the Office of the Secretary of Defense, Director Defense Test and Evaluation and the Office of Naval Research ONR Contract Number N00014-79-C-0231, June 1983

63. K. Vairavan and R. A. DeMillo, "On the Computational Complexity of a Generalized Scheduling Problem," *Distributed Computing: Concepts and Implementations*, edited by Paul L. McEntire, John G. O'Reilly and Robert E. Larsen, published by the IEEE Press (1984). *Reprinted. See main entry number [18]*

64. R. A. DeMillo, R. A. Gagliano, R. J. Martin, and J. F. Passafiume, "Policy Recommendations for Software Test and Evaluation: System Level Test Issues", *Journal of Test and Evaluation*, January 1984, Vol. V, No. 1, pp 21-28

65. R. A. DeMillo, R. J. Lipton, and A. J. Perlis, "Social Processes and Proofs of Theorems and Programs," *Mathematics: People, Problems, Results*, edited by D. C. Campbell and J. C. Higgins, published by Wadsworth International (1984) *Reprinted. See main entry number [39]*

66. R. W. Bartlett and R. A. DeMillo, "Computer Litigation: What the Lawyer Expects and What the Expert Needs," *Computer Law: Institute of Legal Education,* July, 1986, Atlanta, GA, pp. 167-178.

67. R. A. DeMillo, "Functional Capabilities of a Test and Evaluation Subenvironment in an Advanced Software Engineering Environment" GIT-SERC-86/07.

68. R. A. DeMillo, E. H. Spafford, "The Mothra Software Testing Environment", *Proceedings 11th NASA Software Engineering Workshop*, NASA Goddard, December 3, 1986

69. E. W. Martin, R. A. DeMillo, "Operational Survivability in Gracefully Degrading Distributed Processing Systems," *IEEE Transactions on Software Engineering*, June 1986, Vol. SE-12, Number 2

70. R. A. DeMillo, et al "The Mothra Software Testing Environment System Documentation," Georgia Institute of Technology, Software Engineering Research Center, Atlanta, Georgia 30332, June 1987, GIT-SERC-87-10. (Second Revision published by The Software Engineering Research Center, Purdue University, January 1990)

71. R. A. DeMillo, D. S. Guindi, K. N. King & W. M. McCracken, "An Overview of the Mothra Software Testing Environment," Purdue University, Software Engineering Research Center, West Lafayette, Indiana 47907, August, 1987, SERC-TR-3-P

72. R. A. DeMillo, R. J. Lipton, and A. J. Perlis, "Social Processes and Proofs of Theorems and Programs," *Currents in the Philosophy of Mathematics* edited by Thomas Tomasczko (1987). *Reprinted. See main entry number [39]*

73. W. F. Applebee, R. A. DeMillo, D. S. Guindi, K. N. King, and W. M McCracken, "Using Mutation Analysis for Testing Ada Programs," *Proceedings Spring 1988 Ada Europe Conference*, Munich, FDR. (North-Holland, 1988, also appears as Software Engineering Research Center, Purdue University Technical Report SERC-TR-9-P

74. B. Choi, R. DeMillo, W. Du, and R. Stansifer, "Observing Reusable Ada Software Components - Techniques for Recording and Using Operational Histories," Purdue University, Software Engineering Research Center, West Lafayette, Indiana 47907, 1988, SERC-TR-18-P

75. R. A. DeMillo, D. S. Guindi, K. N. King, W. M. McCracken, and A. J. Offutt, "An Extended Overview of the Mothra Software Testing Environment," *Proceedings of the Second Workshop on Software Testing, Verification and Analysis*, Banff, Canada, July 1988, pp. 142-151

76. R. A. DeMillo and A. J. Offutt, "Experimental Results of Automatic Test Data Generation," *Proceedings of Portland Software Quality Conference*, September 1988

77. B. Choi, R. A. DeMillo, R. Stansifer, and W. Du, "Observation Packages for Reusable Ada Components," *Proceedings of Symposium on Empirical Foundations of Information Sciences and Systems* (October, 1988)

78. R. A. DeMillo, E. W. Krauser and A. P. Mathur, "Using the Hypercube for Reliable Testing of Large Software," Software Engineering Research Center, Research Report Number SERC-TR-24-P, August, 1988, Purdue University

79. H. Agrawal, R. DeMillo, and E. Spafford, "A Process State Model to Relate Testing and Debugging," Software Engineering Research Center, Research Report Number SERC-TR-27-P, September, 1988, Purdue University

80. R. A. DeMillo, "Test Adequacy and Program Mutation," *Proceedings 1989 International Conference on Software Engineering*, May 1989, Also appears as Software Engineering Research Center, Research Report SERC-TR-37-P, Purdue University

81. B. Choi, R. A. DeMillo, E. W. Krauser, R. J. Martin, A. P. Mathur, A. J Offutt, E. H. Spafford, "The Mothra Toolset," *Proceedings 22nd HICSS*, January 1989

82. R. A. DeMillo, "Software Testing for Critical Applications: A Position Paper," *Proceedings 13th IEEE Computer Software and Applications Conference*, Orlando, September, 1989, p. 521

83. H. Agrawal, R. A. DeMillo, R. Hathaway, E. W. Krauser, R. J. Martin, and A. P. Mathur, "The Design of Mutation Operators for C", 1989 (Submitted for Publication), also appears as "Design of Mutant Operators for the C Programming Language", Software Engineering Research Center Research Report SERC-TR-41-P, Purdue University

84. R. A. DeMillo and R. J. Lipton, "Software Windtunnels: Scale Models of Software Development Projects."

85. H. Agrawal, B. Choi, R. A. DeMillo, and A. Mathur, "CIT/CAT: Two Novel Methodologies for the Design of Software Testing Tools,", 1990

86. R. A. DeMillo, E. W. Krauser, and A. P. Mathur, "An Approach to Compiler-Integrated Software Testing," Software Engineering Research Center, Research Report SERC-TR-71-P, April 1990, Purdue University

87. H. Agrawal, R. A. DeMillo and E. H. Spafford, "An Execution Backtracking Approach to Program Debugging," *IEEE Software,* May 1991, p. 21-26

88. R. A. DeMillo and R. J. Lipton, "Defining Software by Continuous, Smooth Functions," *IEEE Transactions on Software Engineering,* Vol. SE-17, No. 4, April 1991, p 383

89. R. A. DeMillo, "Progress Toward Automating Software Testing," *Proceedings of the International Conference on Software Engineering,* Austin, Texas, May 1991, Also appears as Software Engineering Research Center Report Number SERC-TR-101-P, July, 1991, Purdue University

90. Richard DeMillo and Aditya Mathur, "On the Use of Software Artifacts to Evaluate the Effectiveness of Mutation Analysis for Detecting Errors in Production Software," *Thirteenth Minnowbrook Workshop on Software*

Engineering, (also Software Engineering Research Center Report Number SERC-TR-92-P, March, 1991, Purdue University)

91. R. A. DeMillo, E. W. Krauser, and A. P. Mathur, "An Overview of Compiler-Integrated Testing," *Proceedings of the 1991 Australian Software Engineering Conference,* Sydney, Australia, July 1991

92. R. A. DeMillo and A. J. Offutt, "Constraint-Based Test Data Generation," *IEEE Transactions on Software Engineering,*, Vol. SE-17, Number 9, September, l991, pp. 900-910

93. Hiralal Agrawal, Richard A DeMillo and Eugene H. Spafford, "Dynamic Slicing in the Presence of Pointers and Records," *Proceedings Fifth Symposium on Testing Analysis and Verification,* October, 1991, Victoria BC, pp. 60-73. (also appears as: Hiralal Agrawal and Richard DeMillo, "Dynamic Slicing in the Presence of Unconstrained Pointers," Software Engineering Research Center Report Number SERC-TR-93-P, March, 1991, Purdue University)

94. R. A. DeMillo, E. W. Krauser, and A. P Mathur, "Compiler Support for Program Testing on MIMD Architecture, *Proceedings Ninth Annual Pacific Northwest Software Quality Conference*, October, 1991, Portland, Oregon

95. R. A. DeMillo and A. J Offutt, "Experimental Results from an Automatic Test Data Generator" *ACM Transactions on Software Engineering and Methods.* Vol. 2 No. 2, April 1993, pp. 109-127

96. R. A. DeMillo, M. Furst, and R. J. Lipton, "Competitive Strategies for k Servers"

97. H. Agrawal, R. A. DeMillo and E. H. Spafford, "Debugging with Dynamic Slicing and Backtracking," *Software Practice & Experience*, June 1993, Vol. 23 No. 6, pp. 589-616

98. R. A. DeMillo, "A Defense of Incremental Research," *International Perspectives on Software Engineering,* June, 1993, Vol. 1, No. 2, pp. 33-36

99. R. A. DeMillo, R. J. Lipton, and A. J. Perlis, "Social Processes and Proofs of Theorems and Programs," *Program Verification* , edited by Timothy R. Colburn, James H. Fetzer, and Terry L. Rankin and published by Kluwer Academic Publishers (1993).*Reprinted. See main entry number [39]*

100. R. A. DeMillo, T-C Li and A. P. Mathur, "A Two Dimensional Scheme to Evaluate the Adequacy o f Fault Tolerance Testing," In Third IEEE International Workshop on Integrating Error Models with Fault Injection, pp. 54-56, Annapolis, MD, April, 1994

101. R. A. DeMillo, A. P. Mathur, and E. W. Wong, "Some Critical Remarks on a Hierarchy of Fault Detecting Abilities for Program Testing," IEEE Transactions on Software Engineering, 1995

102. R. A. DeMillo, "A Simple Architectural Rule for Conservatively Allocating Software Reliability Requirements,"

103. R. A. DeMillo, "Testability in Software Architectures: Some Definitional Suggestions"

104. R. A. DeMillo and M. Young, "Non-Functional Aspects of Software Architecture Design", Proceedings Workshop on Software Architectures, 17th International Conference on Software Engineering, Seattle, Washington, April 1995, pp. 72-79

105. R. A. DeMillo, "Scalability in Software Architectures"

106. R. A. DeMillo and M. Young, "Quantitative Aspects of Software Architecture" Proceedings of the 15th Annual Software Technology Conference, Salt Lake City, Utah, April, 1995

107. R. A. DeMillo and D. I. Hmeljak, "C_{pk} Calibration of the Capability Maturity Model"

108. R. A. DeMillo and R. J. Lipton, "A Gang of Ten Problems in Formal Methods" (unpublished manuscript), 1994 *An earlier version of this paper was presented by the first author at the 1990 ACM Symposium on Test, Analysis and Verification, Victoria, BC*

109. A. Apostolico, G-F. Bilardi, F. Bombi and R. A. DeMillo, "An International Masters Program in Software Engineering: Experience and Prospects" Proceedings 11th Data Engineering Conference, Taipei, Taiwan, March 1995

110. R. A. DeMillo, T-C Li, A. P. Mathur, "Using a Hierarchical Failure Mode Set to Assess the Adequacy of Test for Fault-Tolerance," Fourth IEEE International Workshop on Evaluation Techniques for Dependable Systems, 1995

111. R. A. DeMillo, H. Pan, and E. H. Spafford, "Critical Slicing" Proceedings 1996 ACM International Symposium on Software Test and Analysis, San Diego, California, pp. 121-134, January 1996

112. R. A. DeMillo, "Mission-Critical Applications, Commercial Value and Software Quality", ACM Symposium on Strategic Research Directions (June 1996) Boston, Massachusetts.

113. D. Boneh, R. DeMillo and R. J. Lipton, "Encrypted Quantum Measurement" (unpublished manuscript, 1996)

114. L. Osterweil, L. Clarke, R. A. DeMillo, S. F. Feldman, W.McKeeman, E, Miller and J. Salasin, "Strategic Directions in Computing: Software Quality", Symposium on Strategic Research Directions (June 1996) Boston, Massachusetts.

115. R. DeMillo and R. J. Lipton, "Critique of Formal Verification: Alan Perlis and the Seeds of Method and Doubt", in *In the Beginning: Personal Recollections of Software Pioneers* (R. L. Glass, editor) IEEE Computer Society Press (to appear)

116. D. Boneh, R. DeMillo and R. J. Lipton, "On the Importance of Checking Computations" *Eurocrypt 97*, Springer-Verlag, Heidelberg, May 1997

117. R. DeMillo, H. Pan and E. Spafford, "Failure and Fault Analysis for Software Debugging," *Proceedings IEEE COMPSAC*, 1997.

118. R. DeMillo, "The Internet as a Telephone Network", *Educom Review,* Jan/Feb 1998, pp. 12-16.

119. R. A. DeMillo, R. J. Lipton, and A. J. Perlis, "Social Processes and Proofs of Theorems and Programs," *New Directions in the Philosophy of Mathematics* edited by Thomas Tomasczko (Revised and Expanded Edition, 1998), Princeton University Press, pp. 267-286 *Reprinted. See main entry number [40]*

120. D. Boneh, R. A. DeMillo and R. J. Lipton, "On the Importance of Eliminating Errors in Cryptographic Computations, *Journal of Cryptography 14 (2001) 2, 101-119.* See main entry [115]. This paper has been cited many times. It resulted in a revision to the Open SSL Toolkit (rev 0.9.7) requiring a check of the RSA-CRT result.

121. R. A. DeMillo and R. J. Lipton, "Social Processes and Proofs: A Quarter-Century Perspective," Presented to the Royal Society of London, October, 2004.

122. R. C. Basole and R. A DeMillo, "Information Technology" in *Enterprise Transformation* (edited by W. C. Rouse) Wiley, 2006

123. Richard A. DeMillo, "Keeping Technology Promises," *Communications of the ACM*, November 2012 (Volume 55, No. 11): 37-40.

124. P. M. A. Baker, K. R. Bujak, and R. A. DeMillo, "The Evolving University: Disruptive Change and Institutional Innovation," *Procedia Computer Science,* 14, pp. 330-335.

125. Richard A. DeMillo, "Unbundling Higher Education," in *MOOCs and Open Education Around the World* (edited by Curtis J. Bonk, Mimi Miyoung Lee, Thomas C. Reeves, and Thomas Reynolds) Routledge, 2015.

126. Rafael L. Bras and Richard A. DeMillo, "Leadership Challenges in Higher Education's Digital Future," in *Challenges in Higher Education Leadership,* (edited by James Soto Anthony, Ana Marie Cauce, and Donna Shalala), Routeledge, 2017.