

L. RIDGWAY SCOTT

Born 27 March 1948

Marital status married (three children)

Degrees

B. S., Tulane University, 1969

Ph. D., Massachusetts Institute of Technology, 1973.

Previous Employment

University of Chicago: Instructor, 1973–1975

Brookhaven National Laboratory: Associate Mathematician, 1975–1977, Mathematician, 1977–1978

University of Michigan: Assistant Professor of Mathematics, 1978–1980, Associate Professor of Mathematics, 1980–1984, Professor of Mathematics, 1984–1986

Pennsylvania State University: Professor of Computer Science and of Mathematics, 1986–1989

University of Houston: Professor of Computer Science and of Mathematics, 1989–1998. M. D. Anderson Professor 1995–1998.

Current Positions

Professor

Department of Computer Science and Department of Mathematics, and the College, University of Chicago, since 1998. Louis Block Professor since 2001.

Member

Institute for Biophysical Dynamics (IBD), University of Chicago, since 1998.

Senior Fellow

Computation Institute, University of Chicago & Argonne National Laboratory, since 1999. (Founding co-director, 1999-2002.)

Administrative Experience

Member of the Council of the Senate of the University of Chicago, 2010-present.

Member of the Committee of the Council of the Senate of the University of Chicago, 2002-2004. Spokesman of the Committee of the Council in 2003-2004. The Committee of the Council of the Senate meets every two weeks with the President and Provost to plan University policy and deal with emergency issues. The Spokesman is the chair of that Committee and interacts more frequently with the Administration.

Founding Chairman of the Local Academic Advisory Committee, Toyota Technological Institute at Chicago (TTI-C), 2000–2004. The Toyota Technological Institute at Chicago was established with a \$100 Million fund from Toyota Motor Corporation co-located with the University of Chicago. TTI-C is devoted primarily to computer science and has an operating budget in excess of \$5 Million per year. Initially, my duties included site selection and planning as well as faculty recruitment.

Founding member, Scientific Advisory Board, Functional Genomics Facility, 2000-2006. The Functional Genomics Facility provides microarray core capabilities to the Chicago research community, including an Affymetrix system. My responsibilities concerned setting up the bioinformatics systems used by the Facility.

Founding Co-director, Computation Institute, University of Chicago & Argonne National Laboratory, 1999-2002. Interdisciplinary research at the University of Chicago is orga-

nized via Institutes, such as the Fermi Institute. The CI is devoted to fostering computational research in all areas of the University and Laboratory.

Member of the proposal preparation committee for NPACI (National Partnership for Advanced Computational Infrastructure), 1997-1998. Helped in the recompetition for the NSF-funded San Diego Supercomputer Center. Subsequently participated in the NPACI Programming Tools & Environments group through 2000.

Co-founder of Advanced Science of Design, Inc., 1997. President and CEO, 1997-2002. Developed Analysa software system to automate the solution of partial differential equations.

Director, Texas Center for Advanced Molecular Computation (TCAMC), 1992-1998. The TCAMC began as a Grand Challenge Application Group devoted to parallel computation in biomolecular design, funded by the National Science Foundation and ARPA for \$3 Million over five years. Its budget grew to over \$1 Million per year, with over forty full-time participants, focusing broadly on parallel computing and scientific simulation.

Management Committee, Keck Center for Computational Biology, 1992-1998. The Keck Center started as a collaboration among the University of Houston, Baylor College of Medicine, and Rice University. The Management Committee administered several millions of dollars in federal grants for pre-doctoral and post-doctoral interdisciplinary training in the emerging field of Computational Biology.

Member editorial board of

SIAM Journal for Numerical Analysis, 1979–1997

R. A. I. R. O. Numerical Analysis (new name: M^2AN), 1981–2005

Mathematics of Computation, 1984–1999

Houston Journal of Mathematics, 1990–1999

Notices of the AMS, 1991–1994

SIAM Review, 1995–1999, 2010–.

Honors and Awards

B. S. *Magna Cum Laude*, Tulane University, 1969

Phi Beta Kappa

Woodrow Wilson Fellowship Designate, 1969

Sloan Graduate Fellowship, MIT, 1969–1973

Invited Hour Speaker, American Mathematical Society Regional Meeting, 1987

Ordway Visiting Distinguished Professorship, University of Minnesota, March, 1997.

Visiting Fellowships

University of Bonn, West Germany, 1976, 1978, 1979 (one month each time)

I C A S E, NASA Langley Research Center, 1979 (three months)

Mathematics Research Center, University of Wisconsin, 1980–1981 (9 months), 1985 (3 months)

Centre de Mathématiques Appliquées, Ecole Polytechnique, Paris, 1981–1982 (nine months)

Center for Nonlinear Studies, Los Alamos National Laboratory, 1985 (three months)

Institute for Mathematics and Its Applications, University of Minnesota, 1986 (four months), 1997 (one month), 2008-9 (ten months)

Mittag-Leffler Institute, 1998 (one month).

Consultant to

Los Alamos National Laboratory, 1985–1986
KMS Fusion (Ann Arbor, Michigan), 1985–1989
US Army White Sands Missile Range, 1990–1996
Open Channel Software, 1999–2002
Toyota Technological Institute at Chicago, 2000–2008
Blue Operations, 2001–2003.

Organizing/Scientific Committees

Theory vs. Practice in the Finite Element Method, AAAS Meeting, 1974
Finite Element Circus, 1976 (Brookhaven), 1980 (Michigan), 1987 (Penn State), 1991 (Houston)
NSF Workshop on Scientific Computing in the Mathematical Sciences, Boulder, 1984
International Conference on Spectral and High-Order Methods (ICOSAHOM), 1992, 1995 (Chairman of the Scientific Committee and Host in 1995), 1998, 2001
Mini-track on Computer Design: A New Grand Challenge, in the Architecture Track of the 27th Hawaii International Conference on System Sciences, 1994
Mini-tracks on Grand-Challenge Computation In Computer Design, in the Architecture Track, and on Computational Biology and Parallel Computing, in the BioTechnology Track, of the 28th Hawaii International Conference on System Sciences, 1995
Frontiers of Massively Parallel Computation (Program Vice Chair, Applications), 1995
Program in the Mathematics of High-Performance Computing at the Institute of Mathematics and Its Applications, University of Minnesota, 1996-1997 (Chairman of the Organizing Committee)
International Parallel and Distributed Processing Symposium 2000 Program Committee
Advances in Scientific Computing, a conference held in honor of Todd Dupont's 65th birthday, University of Chicago, 2007
Program in Mathematics and Chemistry at the Institute of Mathematics and Its Applications, University of Minnesota, 2008-2009.

Member, Review Panels

External Review Committee, Mathematics and Computer Sciences Division, Argonne National Laboratory, 1986 and 1988
Application Review Committee, 1992 National Defense Science and Engineering Fellowship Program
Committee on Mathematical Challenges from Computational Chemistry, National Research Council, 1993-1994
Board of Governors, Institute for Mathematics and Its Applications, University of Minnesota, 1997–1999
Advisory Board, NIH Research Resource on Multiscale Modeling Tools for Structural Biology, The Scripps Research Institute, 1997–2005
Advisory Board, National Center for Molecular Imaging, Baylor College of Medicine, 2000–2004
Community Relations Committee, Institute for Mathematics and Its Applications, University of Minnesota, 2009–present

External Review Committee, Department of Mathematics and Computer Science, Emory University, 2010.

Professional memberships

Association for Computing Machinery (SIGGRAPH, SIGNUM, SIGPLAN), American Mathematical Society, IEEE Computer Society, The International Society for Computational Biology, Society for Industrial and Applied Mathematics (Activity Group on Supercomputing).

Selected Students

University of Michigan: Susanne Brenner, Ph.D. in Mathematics, 1988.

Penn State University: Shangyou Zhang, Ph.D. in Mathematics, 1988. Reinhard von Hanxleden, M.S. in Computer Science, 1989. Anirudh Sahni, M.S. in Computer Science, 1989. Cristina Draghicescu, Ph.D. in Mathematics, 1991. Babak Bagheri, Ph.D. in Computer Science, 1994.

University of Houston: Anna Zou, M.S. in Computer Science, 1994. Dexuan Xie, Ph.D. in Mathematics, 1995. Hector Juarez, Ph.D. in Mathematics, 1996. Terry Clark, Ph.D. in Computer Science, 1996. Biao Xu, M.S. in Computer Science, 1996. Li Yuan, M.S. in Computer Science, 1996. Rongjian Lai, M.S. in Computer Science, 1997. Suming Wu, Ph.D. in Mathematics, 1998. Sanjay Datta, Ph.D. in Mathematics, 2000.

University of Chicago: Han Gao, M.S. in Computer Science, 2002. Andrei Draganescu, Ph.D. in Mathematics, 2004. Ernesto Gomez, Ph.D. in Computer Science, 2005. Jing Liu, Ph.D. in Computer Science, 2006. Andy Terrel, Ph.D. in Computer Science, 2010. Peter Brune, Ph.D. in Computer Science, 2011.

Postdoctoral Associates

Dr. Simon Tavener, Penn State University, 1987–1989. Currently Professor of Mathematics, Colorado State University. Dr. Mircea Draghicescu, University of Houston, 1993–1995. Currently at Intel. Dr. Andrew Ilin, University of Houston, 1992–1996. Currently at Lockheed-Martin, Inc. Dr. Z. Hong Zhou, University of Houston, 1995–1997. Currently Professor at UCLA. Dr. Kristina Rogale Plazonic, University of Chicago, 2003–2005. Currently at Princeton Univ. Dr. Christopher M. Fraser, University of Chicago, 2008–2009. Currently at Bioanalytical Computing, LLC.

Courses Introduced

Mathematical Theory of Finite Element Methods, University of Michigan (Math 671), 1983, Penn State University, 1986, University of Houston (Math 7394), 1989.

Lecture notes for this course formed the basis for the book *The Mathematical Theory of Finite Element Methods*, Springer-Verlag, 1994, written jointly with Susanne C. Brenner. The finite element method is the most widely used technique for engineering design and analysis. The course provides an introduction to basic functional analysis, approximation theory and numerical analysis, while building upon and applying basic techniques of real variable theory. It is both a fundamental part of the applied mathematics curriculum and a substantial contribution to the pure mathematics curriculum.

Parallel Scientific Computing, Penn State University, 1988, University of Houston

(Math 6378), 1990, University of Chicago (CS 340), 1999.

Lecture notes for this course form the basis for the a forthcoming book being written jointly with Babak Bagheri and Terry Clark. The course provides an introduction to the fundamental concepts and algorithms of parallel computing. The prerequisites are kept to a minimum to make the subject accessible to a wide audience of scientists and engineers.

Structured Scientific Computing, University of Houston, 1996.

This course introduced the idea of automating software for solving partial differential equations, a precursor to the development of the FEniCS project.

Honors Intro Computing, CMSC 16100, University of Chicago, 2000.

This is the honors version of the introductory programming course based on the Scheme programming language.

Applied Math Literacy, University of Chicago, 2002.

This course was modelled on the Geometric Literacy course and presents topics in applied mathematics to second-year graduate students in mathematics.

Digital Biology, University of Chicago, 2004.

This course attempts to explain how proteins work as a digital information system despite the analog nature of their environment. It has been attended by students at different levels (undergraduates through post-docs) with a very wide range of interests.

Software Automation, University of Chicago, 2007.

This course explores a new paradigm in computing involving the automation of the process of writing software based on precise mathematical models.

Advanced Numerical Analysis, Math 212, University of Chicago, 2009.

This course gives a rigorous introduction to numerical analysis. Assumes as prerequisite a course in analysis comparable to Little Rudin.

Software projects

Numbers for the references for the following software projects correspond to those in the list of publications.

Co-designer of Wrappa, 2008-present, www.wrappa.org. Web-based Residue Analysis Program for hydroPhobicity Assessment: a screening tool to identify candidate dehydrons [146,156].

Co-founder of the FEniCS project, 2003-present, www.fenicsproject.org. Co-designer of the FErari system [134,138,140].

Co-designer of Analysa, 1996-2003. Automated solution of partial differential equations [128]. Included development of a dialect of Scheme called AlScheme that incorporated equational programming, sparse-matrix operations, and extensive numerical and graphical libraries.

Co-designer of Planguages, 1987-present, <http://planguages.cs.uchicago.edu>. Family of parallel programming languages to support the memory model called guarded memory [131]. PC was initiated in [37] and described in [48,49,100,137]. Pfortran described in [59,64]. Pfortran was used in parallel implementations of the computational chemistry codes Gromos and UHBD, and it was deployed as part of the NPACI Programming Tools & Environments at the NSF-funded San Diego Supercomputer Center. PC++ was defined and developed in Babak Bagheri's thesis and included nested parallelism.

Co-developer of Fortran program to integrate a model equation for viscous free-boundary problems in fluid mechanics [51,54,60,67].

Developer of Fortran program to integrate model equations for nonlinear dispersive waves [21,23,24,27,29,34].

Publications

can be found at <http://people.cs.uchicago.edu/~ridg/lrsbib.html>

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