Richard B. Lehoucq

Mathematics and Computer Science Division
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 60439-4844
(630) 252-7587, FAX (630) 252-5986
URL: `http://www.mcs.anl.gov/home/lehoucq/index.html`
Email: `lehoucq@mcs.anl.gov`

5517 King Arthur Ct.
Apartment 14
Westmont, Illinois 60559

RESEARCH INTERESTS

Numerical linear algebra with an emphasis on iterative methods for the large scale eigenvalue problem, and the numerical solution of partial differential equations. Computational science and mathematical software design and development.

EDUCATION

Ph.D.	Computational Science and Engineering, Rice University.	
	Thesis advisor: Danny C. Sorensen.	1995
	Thesis title: *Analysis and implementation of an implicitly restarted Arnoldi iteration*	
M.A.	Computational and Applied Mathematics, Rice University.	1994
M.S.	Mathematics, Virginia Polytechnic Institute and State University.	1986
B.A.	Mathematics, California University of Pennsylvania.	1984

AWARDS

Selected as the 1995 Wilkinson Fellow in scientific computing by the numerical analysis group of Argonne National Laboratory.

EMPLOYMENT HISTORY

Argonne Scholar	Argonne National Laboratory	9-95 to present
Research Associate	Rice University, Houston, Texas.	5-95 to 8-95
Graduate Assistant	Rice University, Houston, Texas.	8-91 to 5-95
Software Engineer	IMSL, Inc., Houston, Texas.	12-88 to 8-91, Summer 1992
Systems Engineer	Texas Instruments, Lewisville, Texas.	8-86 to 11-88

TEACHING EXPERIENCE

Adjunct Lecturer	University of Houston-Downtown, Houston, Texas. Instruction in the Calculus and pre-calculus mathematics.	8-89 to 5-92
Teaching Assistant	Virginia Polytechnic Institute and State University. Instruction in the Calculus and pre-calculus mathematics.	1-85 to 6-86

PUBLICATIONS AND PREPRINTS

The Computation of Elementary Unitary Matrices, Volume 22, Number 4, pp. 393–400, 1996, ACM Transactions on Mathematical Software.

Deflation Techniques for an Implicitly Restarted Arnoldi Iteration, (with D. C. Sorensen), Volume 17, Number 4, pp. 789–821, 1996, SIAM Journal on Matrix Analysis and Applications.

Compiler Blockability of Dense Matrix Factorizations, (with Steve Carr), Preprint MCS-P611-0996, Argonne National Laboratory. Accepted for publication in the ACM Transactions on Mathematical Software.

An Evaluation of Software for Computing Eigenvalues of Sparse Nonsymmetric Matrices, (with J. A. Scott), Preprint MCS-P547-1195, Argonne National Laboratory. Submitted to the ACM Transactions on Mathematical Software.

Truncated QR Algorithms and the Numerical Solution of Large Scale Eigenvalue Problems, Preprint MCS-P648-0297, Argonne National Laboratory.

Restarting an Arnoldi Reduction, Preprint MCS-P591-0496, Argonne National Laboratory.

The Inexact Rational Krylov Sequence Method, (with Karl Meerbergen) Preprint MCS-P612-1096, Argonne National Laboratory. Submitted to the SIAM Journal on Matrix Analysis and Applications.

BOOKS

ARPACK USER'S GUIDE: Solution of Large Scale Eigenvalue Problems by Implicitly Restarted Arnoldi Methods,
(with D.C. Sorensen, C. Yang, Rice University). To be submitted to the SIAM book series on Software, Environments, and Tools. We currently have a finished version that is publicly available. Upon minor changes and updates, we will officially submit the manuscript.

SOFTWARE

Chief maintainer for the ARPACK software package for the numerical solution of large scale eigenvalue problems from 1993 to September 1995. Current involvement is as a consultant for future and ongoing development.

FUNDING

Submitted a proposal (joint with Paul Plassmann) that was awarded $ 20 K to organize an Argonne national laboratory theory institute on the subject of *The Use of Iterative Methods for Large Scale Eigenvalue Problems*. The theory institute is scheduled for May 14-16, 1997.

EDITORIAL SERVICE

Referee for ACM Transactions on Mathematical Software, BIT, Applied Numerical Mathematics, Linear Algebra and its Applications, Numerical Algorithms Journal, SIAM Journal on Matrix Analysis and Applications, SIAM Journal of Scientific Computing and the SIAM book series.

RECENT PRESENTATIONS

The Numerical Solution of the Large Scale Eigenvalue Problem.
- North Carolina State University, Department of Mathematics.
- Virginia Tech, Department of Mathematics.
- Katholieke Universiteit of Leuven, Belgium.
- Chalmers Institute of Technology, Department of Computing Science, Goteburg, Sweden.
- Aeronautical Research Institute of Sweden, Stockholm, Sweden.
- University of Umeå, Department of Computing Science, Sweden.
- NAG, Ltd., Oxford, England.
- Southern Methodist University, Department of Mathematics.
- Boeing Computer Services, Seattle, Washington.
- The University of Texas, TICAM.
- California Institute of Technology, Department of Applied Mathematics.
- UCLA, Department of Mathematics.

Restarting an Arnoldi Reduction.
- Copper Mountain Conference on Iterative Methods, Copper Mountain, Colorado, 1996.

The Stability of the QR Algorithm and its Applications.
- Householder Symposium on Numerical Analysis, Pontresina, Switzerland, 1996.

ARPACK: General Purpose Software for the Large Scale Eigenvalue Problem.
- Argonne National Laboratory Workshop on Matrix Diagonalization Techniques in Computational Chemistry, Argonne, Illinois 1996

The Inexact Rational Krylov Sequence Method. (Joint work with Karl Meerbergen)
- Second SIAM Conference on Sparse Matrices, Coeur d'Alene, Idaho, 1996.

An Implicitly Restarted Block Arnoldi Methods. (Joint work with K.J. Maschhoff)
- Second SIAM Conference on Sparse Matrices, Coeur d'Alene, Idaho, 1996.

REFERENCES

Professor Christopher Beattie	Department of Mathematics Virginia Polytechnic Institute and State University Blacksburg, Virginia 24061	beattie@calvin.math.vt.edu
Dr. John G. Lewis	The Boeing Company Mail Stop 7L-22, P.O. Box 3707 Seattle WA 98124-2207	jglewis@redwood.rt.cs.boeing.com
Professor Axel Ruhe	Department of Computing Science Chalmers University of Technology S-41296 Goteborg, Sweden	ruhe@cs.chalmers.se
Professor Danny C. Sorensen	Department of Computational and Applied Mathematics Rice University, P.O. Box 1892 Houston, Texas 77251-1892	sorensen@caam.rice.edu
Professor Charles Van Loan	Department of Computer Science Cornell University Ithaca, NY 14853	cv@CS.Cornell.EDU