

CURRICULUM VITAE

David Marshall Cohen

OFFICE

Anaplerosis Associates, Inc.
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EDUCATION

- 1981 Ph.D. in Computer and Communication Sciences
The University of Michigan
Ann Arbor, Michigan 48109
A Steady-State-Transition Model of Insulin Secretion. (Doctoral
Dissertation, The University of Michigan). *Dissertation Abstracts
International* 42 (2), 687B (1981).
- 1978 M.S. in Computer and Communication Sciences
The University of Michigan
Ann Arbor, Michigan 48109
- 1974 B.A. in Chemistry, *cum laude*
Case Western Reserve University
Cleveland, Ohio 44106

HONORS AND AWARDS

- 1985 Listed in Who's Who in Frontiers of Science and Technology, Second edition
(Marquis Who's Who, Inc., Chicago, Illinois).
- 1975-1976 Internal Medicine Grant (Pulmonary), Institute of Science and Technology, The
University of Michigan (\$1,000.00).
- 1975-1976 Rackham Graduate Fellowship, The University of Michigan (\$3,000.00).
- 1973 Phi Beta Kappa.

N.I.H. REVIEW PANELS

Member of N.I.H. Special Study Section for the Biomedical Research Technology Program:

"Southwest Biomedical Magnetic Resonance Facility" (1998).

N.I.H. peer review consultant, Special Study Section: "Southwest Biomedical Magnetic Resonance Facility" (1992).

PROFESSIONAL EXPERIENCE

2006- present President, Anaplerosis Associates, Inc. (formerly DMC Consulting, Inc.)

9795 Westchester Drive, Omaha, Nebraska

Founded a consulting company, specializing in biomedical scientific research, including mathematical modeling and computer simulation of metabolism

Running day-to-day operations and long term planning for biotechnology start-up

2004- 2006 Research Scientist

Department of Diagnostic and Interventional Imaging, University of Texas Health Science Center, Houston, Texas

Management of Bruker's Paravision system for 7T Biospec horizontal bore MRI scanner.

Development of software for use with the Bruker Paravision system, including macros and pulse programs.

Estimation of changes in vascular permeability following traumatic injury to spinal cord in rats, using gadolinium injection and mathematical modeling of magnetic resonance imaging.

2003- 2004 Research Assistant Professor

Department of Chemistry, University of Houston, Houston, Texas

Bioinformatics analysis of microfluidic gene chips, studies of specificity and sensitivity.

1998- 2003 Assistant Professor

USDA/ARS Children's Nutrition Research Center, Baylor College of Medicine, Houston, Texas

Completed development of new method for estimation of rate of cerebral glucose utilization, using ^{13}C -nuclear magnetic resonance spectroscopy.

Consulted with faculty members on questions of mathematical modeling related to metabolic pathways.

Organized and delivered lectures on mathematical modeling related to metabolism, including tracer kinetic modeling.

1996-1998 National Research Council Senior Research Associate

Laboratory of Cerebral Metabolism, National Institute of Mental Health and In Vivo NMR Center, National Institutes of Health, Bethesda, MD

Training in cerebral metabolism, especially concepts and techniques related to Louis Sokoloff's methods for measurement of the rate of cerebral blood flow and the rate of cerebral glucose metabolism

Training in *in vivo* NMR spectroscopy using a Bruker and Varian 4.7T NMR spectrometers.

Lectures in theory of NMR spectroscopy and cerebral metabolism.

Discussion of new method for estimation of the rate of cerebral glucose metabolism, using ^{13}C -nuclear magnetic resonance spectroscopy.

1994-1996

Research Associate Professor of Physiology and Biophysics

Department of Physiology and Biophysics, University of Southern California, Los Angeles, CA

Continuation of modeling of metabolic pathways and estimation of metabolic flux rates from ^{13}C –enrichment of metabolites.

1990-1994

Postdoctoral Fellow, Laboratory of Richard N. Bergman, Ph.D.

Department of Physiology and Biophysics, University of Southern California, Los Angeles, CA

Major change in my research focus. Development of the syntactic approach to modeling of metabolic pathways and the prediction of positional isotopomers. Estimation of metabolic flux rates from ^{13}C –enrichment of intermediary metabolites.

1985-1990

Assistant Professor

Department of Computer Science, University of Iowa, Iowa City, Iowa

Performed research on biological modeling and parallel computing, using the Massively Parallel Processor Computer at the NASA Goddard Space Flight Center.

Taught courses in discrete mathematics, data structures, theory of computation, complexity theory, and compiler construction.

1983-1985

Senior Software Engineer

Applied Dynamics International, Ann Arbor, Michigan

Worked on the design and construction of a compiler for a peripheral array processor (parallel computer).

Performed research on compiler algorithms for multiprocessors, computational parallelism, and optimization of microcode.

Consulted on problems concerning intermediate code generation, common subexpression detection, and other topics related to compiler design.

Taught seminars on compiler design, emphasizing parsing techniques.

1981-1983

Assistant Professor

Department of Computer Science, University of Michigan - Flint, Flint, Michigan 48503

Taught undergraduate courses in Pascal, PL/I, and FORTRAN programming, foundations of computer science, artificial intelligence, and compiler construction.

1977-1981

Research Assistant

Logic of Computers Group, Department of Computer and Communications Sciences, University of Michigan, Ann Arbor, Michigan

Support for my dissertation work on mathematical modeling of insulin secretion.

1979-1980

Staff Assistant

LSA College Administration, University of Michigan, Ann Arbor, Michigan

Completed the writing and debugging of a database management system for personnel records.

1977-1979 Teaching Assistant

Department of Computer and Communications Sciences, University of Michigan, Ann Arbor, Michigan
Organized and delivered lectures for introductory courses in computer programming.

1974-1975 Copy Editor

American Institute of Physics, New York, NY
Copy editor for the Journal of Chemical Physics.

RESEARCH FUNDING

Principal Investigator David M. Cohen
Title: Cerebral and Peripheral Glucose Fluxes
Granting Agency United States Department of Agriculture (USDA)
Duration July 1, 1999 - June 30, 2002
Amount: \$222,290 (direct costs)

Principal Investigator David M. Cohen
Title: Noninvasive, Rapid Estimation of Local Rates of Cerebral Glucose Metabolism
Granting Agency National Institutes of Health
National Research Council Senior Research Associateship
Duration August 1, 1996-July 30, 1998

Principal Investigator David M. Cohen
Title: A Novel Computational Approach for Predicting Gluconeogenic Flux
Granting Agency: The University of Southern California
Faculty Research and Innovation Fund
Duration: July 1, 1991 - June 30, 1992
Amount: \$14,000.00

Principal Investigator David M. Cohen
Title: Mathematical Modeling of Insulin Secretion
Granting Agency: The University of Iowa
N.I.H. Biomedical Research Support Grant
Grant Number: RR 070 35-22
Duration: January 1, 1987 - January 1, 1988
Amount: \$10,000.00

PUBLICATIONS

Full papers (published in refereed journals):

Patel, Chirag B., **Cohen, David M.**, Ahobila-Vajjula, Pallavi, Sundberg, Laura M., Chacko, Tessy and Narayana, Ponnada A. Effect of VEGF Treatment on the Blood-Spinal Cord Barrier Permeability in Experimental Spinal Cord Injury: Dynamic Contrast-Enhanced Magnetic Resonance Imaging. *J. Neurotrauma* **26**, 1-12, 2009.

Cohen, David M., Patel, Chirag B., Ahobila-Vajjula, Pallavi, Sundberg, Laura M., Chacko, Tessy, Liu, Shi-Jie and Narayana, Ponnada A. Blood-Spinal Cord Barrier Permeability in Experimental Spinal Cord Injury: Dynamic Contrast-Enhanced MRI. *NMR in Biomedicine* **22**, 332-341, 2009.

Sakai, Rosei, **Cohen, David M.**, Henry, Joseph F., Burrin, Douglas G., and Reeds, Peter J. Leucine-nitrogen metabolism in the brain of conscious rats: Its role as a nitrogen carrier in glutamate synthesis in glial and neuronal metabolic compartments. *J. Neurochem.*, **88**, 612-622, 2004.

Cohen, David M. and Bergman, Richard N. Estimation of Metabolic Flux From Dominant Rate Constants In Vivo: Application to Brain and Heart. *Metabolic Engineering*, **6**, 59-74, 2004.

Cohen, David M., Guthrie, Patrick H., Gao, Xiaolian, Sakai, Ryosei, and Taegtmeier, Heinrich. Glutamine Cycling in Isolated Working Rat Heart. *Am. J. Physiol. Endocrinol. Metab.*, **285**, E1312-E1316, 2003.

Wei, Jingna, **Cohen, David M.**, and Quast, Michael J. Effects of 2-Deoxy-D-glucose on focal cerebral ischemia in hyperglycemic rats. *J. Cerebral Blood Flow Metab.*, **23**, 556-564, 2003.

Cohen, David M., Wei, Jingna, Smith, E. O'Brian, Gao, Xiaolian, Quast, Michael J., and Sokoloff, Louis. A Method for Measuring Cerebral Glucose Metabolism In Vivo by ¹³C-NMR Spectroscopy. *Magnetic Resonance in Medicine*, **48**, 1063-1067, 2002.

Goodwin, Gary W., **Cohen, David M.**, and Taegtmeier, Heinrich. [5-³H]glucose overestimates glycolytic flux in isolated working rat heart: role of the pentose phosphate pathway. *Am. J. Physiol. Endocrinol. Metab.*, **280**, E502-508, 2001.

Gotoh, Jun, Kuang, Tang-Yong, Nakao, Yasuaki, **Cohen, David M.**, Melzer, Peter, Itoh, Yoshiaki, Pak, Hazel, Pettigrew, Karen D., and Sokoloff, Louis. Regional differences in mechanisms of cerebral circulatory response to neuronal activation. *Am. J. Physiol. Heart Circ. Physiol.*, **280**, H821-H829, 2001.

Nakao, Yasuaki, Gotoh, Jun, Kuang, Tang-Yong, **Cohen, David M.**, Pettigrew, Karen D., and Sokoloff, Louis. Cerebral blood flow responses to somatosensory stimulation are unaffected by scopolamine in unanesthetized rat. *J. Pharmacol. Experimental Therapeutics*, **290** (2), 929-934, 1999.

Cohen, David M. and Bergman, Richard N. Improved Estimation of Anaplerosis in Heart Using ¹³C-NMR. *Am. J. Physiol.*, **273**:E1228-E1242, 1997.

Finch, Caleb E. and **Cohen, David M.** Aging, Metabolism, and Alzheimer Disease: Review and Hypotheses. *Experimental Neurology*, **143**:82-102, 1997.

Cohen, David M. Inhibition of glutamine synthetase induces critical energy threshold for neuronal survival. In Cerebrovascular Pathology in Alzheimer's Disease. *Annals NY Acad Sci.*, 826, 456-460, 1997.

Cohen, David M. and Bergman, Richard N. Estimation of TCA cycle flux, aminotransferase flux, and anaplerosis in heart: Validation with syntactic model. *Am. J. Physiol.*, **268**:E397-E409, 1995.

Cohen, David M. and Bergman, Richard N. SYNTAX: A Rule-Based Stochastic Simulation of the Time-Varying Concentrations of Positional Isotopomers of Metabolic Intermediates. *Computers and Biomedical Research*, **27**:130-147, 1994.

Cohen, David M. and Bergman, Richard N. Prediction of Positional Isotopomers of the Citric Acid Cycle: the Syntactic Approach. *American Journal of Physiology*, **266**:E341-E350, 1994.

Cohen, David M. and Linhardt, Robert J. Randomness in the Heparin Polymer: Computer Simulations of Alternative Action Patterns of Heparin Lyase. *Biopolymers*, **30**: 733-741, 1990.

Carmichael, G.R., **Cohen, David M.**, Cho, S.-Y., and Oguztuzun, M.H. Coupled Transport/Chemistry Calculations on the Massively Parallel Processor Computer. *Computers in Chemical Engineering*, **13**: 1065-1073, 1989.

Linhardt, Robert J., **Cohen, David M.**, and Rice, Kevin G. Nonrandom Structural Features in the Heparin Polymer. *Biochemistry*, **28**: 2888-2894, 1989.

Cohen, David M. and Pek, Sumer Belbez. Selective Effects of Secretagogues on Insulin Secretion: A Mathematical Model. *Computers in Biology and Medicine*, **14**: 191-207, 1984.

PUBLICATIONS: Letters

Taegtmeier, Heinrich and **Cohen, David M.** Overestimating glycolysis in rat heart. (Letter). *Am. J. Physiol. Endocrinol. Metab.* 283: E1102-E1104, 2002.

PUBLICATIONS: Abstracts

Patel, C.B., **Cohen, D.M.**, Ahobila-Vajjula, P., Sundberg, L.M., Chacko, T., and Narayana, P.A. Effect of VEGF Treatment on the Blood-Spinal Cord Barrier Permeability in Experimental Spinal Cord Injury: Dynamic Contrast-Enhanced Magnetic Resonance Imaging. *Proc. Intl. Soc. Mag. Reson. Med.* 17, 635, 2009.

Cohen, D.M., Ahobila, P., Chacko, T., Ramu, J., Narayana, P.A. Longitudinal Changes in Vascular Permeability in Spinal Cord: Dynamic Contrast Enhanced MRI. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, 2005, Abstract 1090.

Wei, Jingna, **Cohen, David M.**, and Quast, Michael J. Effects of 2-Deoxy-D-glucose and 3-O-methyl-glucose on focal cerebral ischemia in hyperglycemic rats. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, 2003, Abstract 2668.

Cohen, David M., Wei, Jingna, Smith, E. O'Brian, and Quast, Michael J. Plasma Glutamine Potentiates the Cerebral Metabolic Response to Methionine Sulfoximine. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, 2002, Abstract 950.

Wei, Jingna, **Cohen, David M.**, and Quast, Michael J. Effects of 2-Deoxy-D-glucose on Focal Cerebral Ischemia in Hyperglycemic Rats. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, 2002, Abstract 582.

Cohen, David M., Quast, Michael J., Wei, Jingna, Gao, Xiaolian, Smith, E. O'Brian, and Sokoloff, Louis. Rapid Estimation of Cerebral Glucose Metabolism in the Rat. In *Proceedings of the International Society for Magnetic Resonance in Medicine*, 2001, Abstract 1024.

Cohen, David M., Quast, Michael J., Wei, Jingna, Gao, Xiaolian, Smith, E. O'Brian, and Sokoloff, Louis. Ten minutes suffices to estimate rates of cerebral glucose metabolism in rats. *FASEB J.*, 15 (5), A752, (Abstract 628.11), 2001.

Cohen, David M., DeMar, James C. and Heird, William C. Theoretical Investigation of Fractional Synthetic Rate in Non-Steady State. *Diabetes*, Suppl. 1, 48, A447, 1999.

Haymond, Morey W., Sunehag, Agneta L., and **Cohen, David M.** Measurement of Gluconeogenesis Using [U-¹³C]Glucose: The Reciprocal Pool Model. *Diabetes*, Suppl. 1, 48, A49, 1999.

Kuang, T.-Y., Cook, M., Nakao, Y., Gotoh, J., Wang, R., **Cohen, David M.**, Kennedy, C., and Sokoloff, L. Effect of Caffeine on Activation of Local Cerebral Glucose Utilization by Somatosensory Stimulation in Conscious Rats. *Soc. Neurosci Abstracts* 24 (part1): 1171; 1998.

Cohen, David M. Inhibition of Glutamine Synthetase Induces Energy Threshold for Continued Release of Neurotransmitter. *J. Neurochemistry*, 69, Suppl. 1, page S-275, 1997.

Riese, K., **Cohen, David M.**, and Bergman, R.N. Stochastic Properties of Metabolites are Dependent Upon Their Own Concentrations and Enzymatic Rates But Not Upon Those of Other Metabolites, As Calculated by SYNTAX. *FASEB J.*, 11 (3), A602, Abstract 3481, 1997.

Cohen, David M. and Bergman, Richard N. Limited Accuracy of Isotopomer Analysis in the Non-Steady State. *Proc. International Society for Magn. Reson. in Medicine.* 2, 1039, 1996.

Cohen, David M. Improving Estimates of Relative Anaplerosis in Heart. *FASEB J.* 10: A328 (# 1891), 1996.

Cohen, David M. and Bergman, Richard N. Improved Estimation of the Rate of Flux Catalyzed by Glutamine Synthetase In Vivo, Using ¹⁵N-NMR Spectroscopy. *J. Neurochemistry*, 66, Suppl. 1, page S-70, 1996.

Cohen, David M. and Bergman, Richard N. Estimation of the Rate of the Tricarboxylic Acid (TCA) Cycle Using [1-¹³C]Glucose Without the Solution of Differential Equations. In *Proceedings of the Society of Magnetic Resonance*, **1**, 303, 1995.

Cohen, David M. and Bergman, Richard N. Estimation of the Rate of the Citric Acid Cycle in Heart Without the Solution of Differential Equations. In *Proceedings of the Second Meeting of the Society of Magnetic Resonance*, **3**, 1235, 1994.

Cohen, David M. and Bergman, Richard N. Prediction of Time-Varying Abundances of Positional Isotopomers in Intermediates of the Pentose Phosphate Pathway: the Syntactic Approach. In *Proceedings of the Society of Magnetic Resonance in Medicine, Twelfth Annual Scientific Meeting*. **3**, 1168, 1993.

Cohen, David M. and Bergman, RN. Prediction of Changes in Abundance of Positional Isotopomers of Glutamate: the Syntactic Approach. *FASEB J.* **7** (7): A1242 (#1107), 1993.

Cohen, David M. and Bergman, RN. Correction to Katz' Formula for the Glucose-Labeling Ratio During Administration of [2-¹⁴C]Acetate. *FASEB J.* **7** (4): A867 (#5009), 1993.

Cohen, David M. and Bergman, RN. Syntactic Model of the Tricarboxylic Acid (TCA) Cycle. *Clinical Research* **40** (1), 123A, 1992.

Cohen, David M. A State-Space Analysis of Phasic Insulin Secretion. *IEEE Transactions on Biomedical Engineering*. **BME-30** (8), 525, 1983.

PUBLICATIONS: Extended Abstracts

Cohen, David M. Syntactic Modeling of Metabolic Pathways. In *Modeling and Control in Biomedical Systems, Proceedings of the IFAC Symposium*, edited by B.W. Patterson (Omnipress, Madison, WI, 1994), 347-349.

Cohen, David M. Suitability of Simulation of a Population of Chemical Polymers on the Massively Parallel Processor. In *Proceedings of the 2nd Symposium on the Frontiers of Massively Parallel Computation*, edited by Ronnie Mills, (IEEE Computer Society Press, Washington, D.C.), 241-247, 1988.

Cohen, David M. and Linhardt, Robert J. Use of Computer Simulation on the Massively Parallel Processor to Study the Structural Features of Heparin. In *Proceedings of the Third International Conference on Supercomputing*, edited by Lana P. Kartashev and Steven I. Kartashev, (International Supercomputing Institute, Inc., St. Petersburg, Florida), **1**, 210-213, 1988.

Cho, Seog Y., Carmichael, Gregory R., **Cohen, David M.**, and Oguztuzun, Mehmet H. Chemical Network Problems Solved on NASA/Goddard's Massively Parallel Processor Computer. In *Proceedings of the First Symposium on the Frontiers of Massively Parallel Scientific Computation*, edited by James R. Fischer, (NASA Conference Publication 2478, NASA Goddard Space Flight Center, Greenbelt, MD), 165-169, 1987.

Carmichael, Gregory R., Cho, Seog Y., and **Cohen, David M.** Chemical Network Problems Solved on NASA/Goddard's Massively Parallel Processor Computer. Work presented at the 1986 Annual Meeting of the American Institute of Chemical Engineers, Miami Beach, Florida, and selected for publication in *Computing and System Technology Division Communications*, volume 9, No. 2, (September, 1986), pp 6-10, 1986.

Cohen, David M. A Unifying Explanation of Time-Dependent Potentiation and Multiphasic Patterns of Glucose-Stimulated Insulin Secretion. In *Proceedings of the Fourteenth Annual Pittsburgh Conference on Modeling and Simulation*, edited by William G. Vogt and Marlin H. Mickle, (Instrument Society of America, Research Triangle Park, N.C.), **14** (part 3), 965-967, 1983.

Cohen, David M. A State-Space Analysis of Phasic Insulin Secretion. In *Frontiers of Engineering and Computing in Health Care - 1983, Proceedings of the Fifth Annual Conference of the IEEE Engineering in Medicine and Biology Society*, edited by Glen C. Gerhard and W. Thomas Miller, (IEEE Computer Society Press, Silver Spring, Md), pp 345-348, 1983.

Cohen, David M. and Pek, Sumer Belbez. A Mathematical Model of Insulin Secretion: Examination of the Synergistic Effects of Two Stimulating Chemicals. In *Proceedings of MEDCOMP '82: First IEEE Computer Society International Conference on Medical Computer Science/Computational Medicine*, (IEEE Computer Society Press, Silver Spring, MD), pp 388-391, 1982.

PUBLICATIONS: Technical Reports

Cohen, David M. *A Steady-state-transition Model of Insulin Secretion.* Logic of Computers Technical Report No. 239 (Department of Computer and Communication Sciences, The University of Michigan, Ann Arbor, MI 48109), 1981.

SEMINARS, INVITED LECTURES, PRESENTATIONS:

(December, 2004). **Cohen, David M.**, Pallavi Ahobila, Tessie Chacko, Jaivijay Ramu, Ponnada A. Narayana. *Modulation of Angiogenesis in Spinal Cord Injury: Dynamic Contrast Enhanced MRI.* Annual Conference, The University of Texas Center for Biomedical Engineering, Houston, Texas. (abstract presentation).

(September, 2003). **Cohen, David M.**, Wei, Jingna, Quast, Michael J., and Sokoloff, Louis. *Improved Sensitivity in an NMR-based Measurement of Glucose Metabolism in Rat Brain Using [6-¹³C]2-Deoxyglucose.* ISMRM Workshop on Dynamic Spectroscopy and Measurements of Physiology, Metabolism, and Function, Orlando, Florida (oral presentation).

(August, 2002). **Cohen, David M.** *Contributions of Computer Science to the Study of Metabolic Pathways using Nuclear Magnetic Resonance Spectroscopy.* Seminar presented to the School of Health Information Sciences, The University of Texas Health Science Center at Houston, Houston, Texas.

(May, 2002). **Cohen, David M.**, Wei, Jingna, Smith, E. O'Brian, and Quast, Michael J. *Plasma Glutamine Potentiates the Cerebral Metabolic Response to Methionine Sulfoximine*. Annual meeting of the International Society for Magnetic Resonance in Medicine, Honolulu, Hawai'i (Poster program number 950, MR Spectroscopy in Animals: Cerebral Metabolism").

(May, 2002). Wei, Jingna, **Cohen, David M.**, and Quast, Michael J. *Effects of 2-Deoxy-D-glucose on Focal Cerebral Ischemia in Hyperglycemic Rats*. Annual meeting of the International Society for Magnetic Resonance in Medicine, Honolulu, Hawai'i (Poster program number 582, MR Spectroscopy in Animals: Cerebral Metabolism").

(April, 2002). **Cohen, David M.**, Guthrie, Patrick H., Gao, Xiaolian, Sakai, Ryosei, and Taegtmeier, Heinrich. *Glutamine cycling in working rat heart*. Experimental Biology 2002, New Orleans, Louisiana (Abstract number 1551, Poster program number 92.19 and oral presentation in "Energy metabolism in skeletal and cardiac muscle").

(April, 2001). **Cohen, David M.**, Quast, Michael J., Wei, Jingna, Gao, Xiaolian, Smith, E. O'Brian, and Sokoloff, Louis. *Rapid Estimation of Cerebral Glucose Metabolism in the Rat*. Annual meeting of the International Society for Magnetic Resonance in Medicine, Glasgow, Scotland, UK (Poster program number 1024, "MRS of Animal Brain").

(April, 2001). **Cohen, David M.**, Quast, Michael J., Wei, Jingna, Gao, Xiaolian, Smith, E. O'Brian, and Sokoloff, Louis. *Ten minutes suffices to estimate rates of cerebral glucose metabolism in rats*. Experimental Biology 2001, Orlando, Florida (poster A20, Program 628.11, "Carbohydrate Metabolism").

(April, 2001). Sakai, Ryosei. Henry, Joseph, Rosenberger, Judy, Burrin, Douglas, **Cohen, David M.**, and Reeds, Peter. *Cerebral leucine nitrogen metabolism in conscious rats*. Experimental Biology 2001, Orlando, Florida (Minisymposium, Program 328.3, "Amino Acid Metabolism II").

(March, 2001). **Cohen, David M.** *NMR and Metabolism*. University of Houston Graduate Seminar in Biochemistry, March 22, 2001, Houston, Texas. Course Instructor: Professor Xiaolian Gao, Ph.D. (invited lecture).

(September, 2000). **Cohen, David M.** *NMR Analysis and Tracer Methodology*. In Principles and Practice of Tracer Methodology in Metabolism, September 10-15, 2000, Galveston, Texas. Course Director: Robert R. Wolfe, Ph.D. (invited lecture).

(August, 1999). **Cohen, David M.** *Potential for Use of ¹³C NMR Spectroscopy for Measurement of Longitudinal Changes in Early Brain Development*. Meeting on Longitudinal Changes in Early Brain Development. Santa Fe Institute, Santa Fe, N.M. (invited lecture).

(May, 1999). **Cohen, David M.** *A Syntactic Model of Metabolism: Relation to NMR Spectroscopy and Measurement of Metabolic Flux*. Festschrift Conference in Honor of John H. Holland, Ann Arbor, Michigan (invited lecture).

(July, 1997). **Cohen, David M.** *Inhibition of Glutamine Synthetase Induces Energy Threshold for Continued Release of Neurotransmitter*. Third International Conference on Brain Energy Metabolism, Waterville Valley, New Hampshire (poster).

(November, 1996). **Cohen, David M.** and Finch, Caleb F. *Inhibition of Glutamine Synthetase Induces Energy Threshold for Neuronal Survival*. Cerebrovascular Pathology in Alzheimer's Disease. East Rutherford, N.J. (poster).

(April, 1996). **Cohen, David M.** and Bergman, Richard N. *Limited Accuracy of Isotopomer Analysis in the Non-Steady State*. Annual meeting of the International Society for Magnetic Resonance in Medicine in New York, N.Y. (poster).

(April, 1996). **Cohen, David M.** *Improving Estimates of Relative Anaplerosis in Heart*. Experimental Biology '96 in Washington, D.C. (poster).

(March, 1996). **Cohen, David M.** and Bergman, Richard N. *Improved Estimation of the Rate of Flux Catalyzed by Glutamine Synthetase in Vivo, using ^{15}N -NMR Spectroscopy*. Annual meeting of the American Society for Neurochemistry, Philadelphia, Pa. (poster).

(August, 1995). **Cohen, David M.** *Estimation of the Rate of Uptake of Glutamine by Astrocytes and the Rate of Flux Catalyzed by Glutamine Synthetase in Vivo, Using ^{15}N -NMR Spectroscopy*. Brain Energy Metabolism: Molecules to Man, Second International Conference, Blaubeuren, Germany (poster).

(July, 1995). **Cohen, David M.** *Estimation of Metabolic Flux Rates: How to Validate the Underlying Metabolic Model*. Presentation to Division of NMR Research, Johns Hopkins University, Baltimore, MD (seminar).

(March, 1995). **Cohen, David M.** and Bergman, Richard N. *Estimation of the Rate of the Citric Acid Cycle in Heart Without the Solution of Differential Equations: Effect of Isotopically Labeled Anaplerosis*. 36th Experimental Nuclear Magnetic Resonance Conference, Boston, Massachusetts (poster).

(March, 1995). **Cohen, David M.** and Bergman, Richard N. *Estimation of the Rate of the Citric Acid Cycle in Heart Without the Solution of Differential Equations: Effect of Isotopically Labeled Anaplerosis*. Workshop on Advances in Physiological Chemistry by *In Vivo* NMR, Woods Hole, Massachusetts (poster).

(April, 1994). **Cohen, David M.** *Estimating the Rate of Flux of the Citric Acid Cycle Without Differential Equations*. Symposium on *In Vivo* Magnetic Resonance Spectroscopy, Department of Radiology, University of California San Francisco, Monterey, CA (invited talk).

(March, 1994). **Cohen, David M.** *Syntactic Modeling of Metabolic Pathways*. IFAC Symposium: Modeling and Control in Biomedical Systems, Galveston, TX (invited talk).

(December, 1993). **Cohen, David M.** and Bergman, Richard N. *Estimation of the Rate of Flux of the Citric Acid Cycle*. Scientific Conference on the Application of Magnetic Resonance to the Cardiovascular System, American Heart Association, Atlanta, GA.

(December, 1993). **Cohen, David M.** and Bergman, Richard N. *Simulation of Time-Dependent Concentrations of Positional Isotopomers of the Citric Acid Cycle: the Syntactic Approach*. Scientific Conference on the Application of Magnetic Resonance to the Cardiovascular System, American Heart Association, Atlanta, GA.

(August, 1993). **Cohen, David M.** and Bergman, Richard N. *Prediction of a Time-Dependent Distribution of Intramolecular Isotopic Labelling Patterns (Isotopomers) Within Metabolic Pathways: the Syntactic Approach.* Society for Industrial and Applied Mathematics (SIAM) Conference on Simulation and Monte Carlo Methods, San Francisco, CA.

(April, 1993). **Cohen, David M.** and Bergman, Richard N. *Correction to Katz' Formula for the Glucose-Labeling Ratio During Administration of [2-¹⁴C]Acetate.* Experimental Biology '93, New Orleans, LA.

(March, 1993). **Cohen, David M.** and Bergman, Richard N. *Prediction of Positional Isotopomers Over Time: the Syntactic Approach.* Workshop on Mass Isotopolog Determination at Experimental Biology '93, New Orleans, LA.

(November, 1992). **Cohen, David M.** *Prediction of Positional Isotopomers of Glutamate.* Poster presented at The Third Keck Symposium on Computational Biology, Rice University, Houston, Texas.

(April, 1992). **Cohen, David M.** *Use of a Syntactic Model to Predict the Spectrum of Isotopomers of Metabolic Intermediates.* Invited lecture, at "Quantitative Approaches to Fuel Metabolism" Minisymposium, Department of Physiology and Biophysics, University of Southern California School of Medicine, Los Angeles, CA.

(March, 1992) **Cohen, David M.** *Use of a Syntactic Model to Predict the Spectrum of Isotopomers of Citric Acid Cycle Intermediates.* Seminar presented at the Department of Endocrinology, Hadassah Medical Center (Ein Kerem), Jerusalem, Israel.

(March, 1992). **Cohen, David M.** *Use of a Syntactic Model to Predict the Spectrum of Isotopomers of the Krebs Cycle.* Seminar presented at the Magnetic Resonance Seminar, Chemical Physics Department, Weizmann Institute of Science, Rehovot, Israel.

(1991, November). **Cohen, David M.** and Bergman, Richard N. *Atomic Flow within the Citric Acid Cycle.* Abstract and poster presented at The Second Keck Symposium on Computational Biology, Houston, Texas.

(1991, November) **Cohen, David M.** *Analysis and Simulation of Atomic Flow in Metabolic Pathways.* Invited lecture presented at colloquium on "Theoretical Advances in Modern Biology", University of Southern California School of Medicine, Department of Physiology and Biophysics, Los Angeles, CA.

(1991, July). **Cohen, David M.** and Bergman, Richard N. *Prediction of Atomic Flow in Metabolic Pathways: The Syntactic Modeling Approach.* Invited presentation at the 13th IMACS World Congress on Computation and Applied Mathematics, Trinity College, Dublin, Ireland.

(1987, September). **Cohen, David M.** *Mathematical Modeling and Analysis of the Patterns of Insulin Secretion.* Poster presented at the *American Society for Microbiology Conference on Experimental and Theoretical Analysis of Metabolic Processes*, Bigfork, MT (September 9-13, 1987).

(1987, May). **Cohen, David M.** *Mathematical Modeling of Insulin Secretion.* Poster presented at the *Workshop on Nonlinearity in Biology and Medicine*, Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM.

(November, 1985). **Cohen, David M.** *Speedup of Serial and Parallel Computation*. Invited lecture, Department of Chemical and Materials Engineering, The University of Iowa, Iowa City, Iowa.

(September, 1985). **Cohen, David M.** *Improvement of Execution Speed in Scientific Computations*. Invited lectures, seminar on Numerical Mathematics, Department of Mathematics, The University of Iowa, Iowa City, IA.

MASTERS THESES SUPERVISED

1987 Sullivan, Kathleen Anne. *From Logic to Petri Nets and Back Again*. M.S. Thesis, Department of Computer Science, The University of Iowa, Iowa City, Iowa.

NATIONAL SCIENTIFIC PARTICIPATION:

Journal Editorial Boards, etc:

Reviewer for Journal of Neurochemistry (2006-present)
Reviewer for Biochemistry (2001-present)
Reviewer for Magnetic Resonance in Medicine (2000-present)
Reviewer for American Journal of Physiology (1991-present)
Reviewer for Molecular and Cellular Biochemistry (1995-present)
Reviewer for Neurobiology of Aging (1995-present)
Reviewer for The Bulletin of Mathematical Biology (1988-1990)
Reviewer for Endocrinology (1988-1990)
Reviewer for The Bulletin of Mathematical Biology (1988-1990)
Reviewer for annual SUPERCOMPUTING Conference (1988-1990)

Professional Societies:

International Society for Cerebral Blood Flow and Metabolism (2003-present)
International Society for Computational Biology (2002-present)
American Society for Nutritional Sciences (2002-present)
American Chemical Society (2000-present).
New York Academy of Sciences (1997-present).
American Physiological Society (1995-present).
American Society for Neurochemistry (1995-present).
American Heart Association (1994-present).
American Society for Biochemistry and Molecular Biology (1993-present).
International Society for Magnetic Resonance in Medicine (1991-present)
American Diabetes Association (1991-present)
The Society for Industrial and Applied Mathematics (1985-1995).
IEEE Society (1984- present)
The American Association for the Advancement of Science (1981-present).
The Association for Computing Machinery (1981-present).
The Alumni Association of the University of Michigan (1981-present).

PROFESSIONAL MEMBERSHIPS

1988-1990 Member, MPP Working Group, NASA/Goddard Space Flight Center,
Greenbelt, MD.

PROFESSIONAL DEVELOPMENT

June, 1983 Studied with Gregory J. Chaitin at the I.B.M. Thomas J. Watson Research
Center, Yorktown Heights, N.Y.

SERVICE

The University of Iowa

1986-1989 Member, High Speed Computing Facility Advisory Group

1987-1988 Member, Academic Dismissal Review Committee

1986-1987 Member, Undergraduate Affairs Committee

1986-1987 Organized a biweekly seminar series on Algorithms, Complexity, and
Computability, which sponsored Robert Tarjan as an Ida Beam Visiting Lecturer
on March 16-20, 1987.