Curriculum vitae of David J. Schneider

Contact information

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Education

B.S.	Biochemistry, *summa cum laude*, University of Minnesota, Minneapolis, MN, 1981.
M.S.	Physical chemistry, Cornell University, Ithaca, NY, 1984.

Research and professional experience

9/01-present	US Dept. of Agriculture, Agricultural Research Service (Ithaca, NY) Computational biologist – development and application of genome scale DNA and protein sequence analysis techniques; suffix tree algorithms; identification of type III secretion system and twin-arginine translocation signal peptides using singular value decomposition; identification of promoters using hidden Markov models.
2/00 - 9/01	Cornell Univ., Cornell Theory Center (Ithaca, NY) Computational biologist and project leader – analysis of genetic maps using graph theory; development of data warehouse technology for DNA sequence analysis results; development and deployment of plant genome databases; research in the applications of Petri nets and constructive Markov modeling techniques to sequence analysis and gene expression problems; analysis of promoter binding sites in bacterial genomes using hidden Markov models and suffix trees methods.
10/98 - 2/00	Cornell Univ., Cornell Theory Center (Ithaca, NY) Interim Director, Institute for Computational Genomics – Computational genomics and bioinformatics: web-based delivery of genomics databases; applications of relational databases to sequence analysis problems in plant genomics; mathematical structure of stochastic gene regulation problems; stochastic models for gene rearrangement; and, development and validation of EST clustering methodologies, development and delivery of bioinformatics course module.
9/93 - 10/98	Cornell Univ., Cornell Theory Center (Ithaca, NY) Parallel computing specialist – Application/system analysis and com-

putational science: resource management and I/O on massively parallel computers; research in simulation techniques for physical phenomena related to magnetic resonance imaging; atomistic simulation and visualization of rapid dynamic fracture; computational genomics and bioinformatics.

12/90 - 9/93 Univ. of Illinois, Center for Supercomputing Research and Development (Urbana, IL)
Senior computer scientist and project leader – Computer science and computational science: coordinating PERFECT Benchmarks activities; directed development of a new version of the PERFECT suite; lead benchmarking and performance evaluation group; coordinated development of seismic processing benchmark suite; conducted simulations of the molecular dynamics of ion-chelate complexes bound to dendrimeric contrast enhancement agents for magnetic resonance imaging.

10/87 - 12/90 IBM Corp., Numerically Intensive Computing Center (Kingston, NY)
Staff scientist/engineer – Computer science and computational science: planning and internally coordinated IBM's participation in the PERFECT Benchmarks group; development of ab initio quantum chemistry codes; identification of novel applications of supercomputers to computational chemistry; optimization of including the PERFECT Benchmarks suite for the IBM 3090; research on applications of the Lanczos and conjugate gradients algorithms in computational chemistry and signal processing.

6/83 - 10/87 Cornell University, Chemistry Department (Ithaca, NY)
Graduate research assistant with Dr. Jack H. Freed - Chemical physics of liquids: research in experimental, computational and theoretical aspects of magnetic resonance lineshape analysis and imaging in isotropic liquids, biological membranes and spin-labeled biopolymers; development of iterative computational techniques for large, sparse, complex non-Hermitian matrices.

7/81 - 6/83 Cornell University, Chemistry Department (Ithaca, NY)
Graduate research/teaching assistant with Dr. Larry Que, Jr. – Biophysical chemistry of non-heme iron proteins: spectroscopic investigations on the structure of iron-tyrosinate proteins and related model compounds using NMR, ESR, resonance Raman, and synchrotron radiation.

10/76 - 7/81 Univ. of Minnesota, Microbiology Department (Minneapolis, MN)
Undergraduate research with Dr. Robert Click – Immunogenetics and cellular immunology of minor histocompatability antigens in the

mouse: use of tissue culture, cell mediated lympholysis assays, and transplantation to study the *H-1*, *H-3*, and *Mls* antigen systems.

Awards and Honors

Member, Gamma Sigma Delta, The Honor Society of Agriculture, 1981.

DuPont graduate teaching assistant award, Cornell University, 1981.

Teaching Experience

"Analysis of Sequence Similarity", Plant Breeding Deptartment, Cornell University, Fall '00 (graduate level).

"Introduction to Computer Science", Computer Science Department, Cornell University, Fall '97 (with C. Van Loan, undergraduate level).

"Intermediate Computer Science", Computer Science Department, Cornell University, Summer '96 (undergraduate level).

"Computational Science", Departments of Computer Science and Electrical and Computer Engineering, Univ. of Illinois at Urbana-Champaign, Fall and Spring '92 (with G. Cybenko, graduate level).

Invited presentations

"Unraveling the secrets of the type III secretion system in *Pseudomonas syringae*" Petroleum Research Foundation Summer School in Chemical Biology (Ithaca, NY, July, 2003).

"Applications of Proteomics to Gene Regulation and Molecular Pathogenesis in *P. syringae* pv. tomato DC3000." New York State Proteomics Symposium (Syracuse, NY, 2003).

"Status and Future of Genome-Scale Bioinformatics", American Phytopathological Society (Washington, D.C., May, 2002).

Fifth Smoluchoski Symposium on Statistical Mechanics (Zakopane, Poland, Sept. 1999).

Cray User's Group Meeting, Performance Special Interest Group (Washington, D.C., September, 1992).

"Parallel Processors – Benchmarking and Assessment", National Physical Laboratory and the British Computer Society (Teddington, Middlesex, UK, March, 1992).

COMPCON Spring '92 meeting (San Francisco, CA, February, 1992).

Computer Measurement Group conference (Nashville, Tennessee, December, 1991).

EuroBen conference (Utrecht, The Netherlands, September, 1991).

"Parallel Computing in Chemical Physics", Argonne National Laboratory, (Willowbrook, Illinois, July, 1991).

Center for Research in Parallel Computation, California Institute of Technology (Pasadena, CA, May, 1991).

ACM Sigmetrics conference tutorial on "Characterization of Scientific Benchmarks", (San Diego, CA, May, 1991).

Professional activities

Member of applicant selection and review committee for the U.S. Department of Energy graduate fellowship program in computational science and engineering (1993-5).

US delegate to US-Japan Supercomputer Performance Evaluation Workshops held under the auspices of the US-Japan Science and Technology Agreement (Kauai, Hawaii, 1991, and Kona, Hawaii, 1994).

Member of program committees for 1995 International Workshop on Computer Performance Measurement and Analysis, 1995 International Conference on Parallel Processing, Supercomputing '94, and "Workshop on Benchmarking and Performance Evaluation in High Performance Computing" (Waseda University, Japan, July, 1993), and Supercomputing '00.

Chairman of the Perfect Benchmarks steering committee (1991-3).

Publications

Book chapters

D. J. Schneider and J. H. Freed. Molecular dynamics and spin relaxation. *Adv. Chem. Phys.*, 73:387, 1989.

D. J. Schneider and J. H. Freed. Calculating slow-motional magnetic resonance spectra: A user's guide. In L. J. Berliner and J. Reuben, editors, *Biological Magnetic Resonance*, volume 8, page 1. Plenum, 1989. (Includes a diskette of programs for calculating slow-motional magnetic resonance spectra written by D. J. Schneider).

Journal articles

C. R. Buell, V. Joardar, M. Lindeberg, J. Selengut, I. T. Paulsen, M. L. Gwinn, R. J. Dodson, R. T. Deboy, A. S. Durkin, J. F. Kolonay, R. Madupu, S. Daugherty, L. Brinkac, M. J. Beanan, D. H. Daft, W. C. Nelson, T. Davidsen, J. Liu, Q. Yuan, H. Khouri, N. Fedorova, B. Tran, D. Russell, K. Berry, T. Utterback, S. E. Vanaken, T. V. Feldblyum, M. D'Ascenzo, W.-L. Deng, A. R. Ramos, J. R. Alfano, S. Cartinhour, A. K. Chatterjee, T. P. Delaney, S. G. Lazarowitz, G. B. Martin, D. J. Schneider, X. Tang, C. L. Bender, O. White, C. M. Fraser, and A. Collmer. The complete genome sequence of the *Arabidopsis* and tomato pathogen *Pseudomonas syringae* pv. tomato DC3000. *Proc. Natl. Acad. Sci. U. S. A.*, in press.

S. R. McCouch, L. Teytelman, Y. B. Xu, K. B. Lobos, K. Clare, M. Walton, B. Y. Fu, R. Maghirang, Z. K. Li, Y. Z. Xing, Q. F. Zhang, I. Kono, M. Yano, R. Fjellstrom, G. DeClerck, D. Schneider, S. Cartinhour, D. Ware, and L. Stein. Development and mapping of 2240 new SSR markers for rice (*Oryza sativa* L.). *DNA Res.*, 9:199–207, 2002.

A. Collmer, M. Lindeberg, T. Petnicki-Ocwieja, D. J. Schneider, and J. R. Alfano. Genomic mining type III secretion system effectors in *Pseudomonas syringae* yields new picks for all TTSS prospectors. *Trends Microbiol.*, 10:462–469, 2002.

T. Petnicki-Ocwieja, D. J. Schneider, V. C. Tam, S. T. Chancey, L. Shan, Y. Jamir, L. M. Schechter, M. D. Janes, C. R. Buell, X. Y. Tang, A. Collmer, and J. R. Alfano. Genomewide identification of proteins secreted by the Hrp type III protein secretion system of *Pseudomonas syringae* pv. tomato DC3000. *Proc. Natl. Acad. Sci. U. S. A.*, 99:7652–7657, 2002.

D. E. Fouts, R. B. Abramovitch, J. R. Alfano, A. M. Baldo, C. R. Buell, S. Cartinhour, A. K. Chatterjee, M. D'Ascenzo, M. L. Gwinn, S. G. Lazarowitz, N. C. Lin, G. B. Martin, A. H. Rehm, D. J. Schneider, K. van Dijk, X. Y. Tang, and A. Collmer. Genomewide identification of *Pseudomonas syringae* pv. tomato DC3000 promoters controlled by the

HrpL alternative sigma factor. *Proc. Natl. Acad. Sci. U. S. A.*, 99:2275–2280, 2002.

F. F. Abraham, D. Brodbeck, W. E. Rudge, J. Q. Broughton, D. Schneider, B. Land, D. Lifka, J. Gerner, M. Rosenkrantz, J. Skovira, and H. Gao. Ab initio dynamics of rapid fracture. *Model. Simul. Mater. Sci. Eng.*, 6:639–670, 1998.

F. F. Abraham, D. Schneider, B. Land, D. Lifka, J. Skovira, J. Gerner, and M. Rosenkrantz. Instability dynamics in three-dimensional fracture: An atomistic simulation. *J. Mech. Phys. Solids*, 45:1461–1471, 1997.

K. M. Salikhov, D. J. Schneider, S. Saxena, and J. H. Freed. A theoretical approach to the analysis of arbitrary pulses in magnetic resonance. *Chem. Phys. Lett.*, 262:17–26, 1996.

E. C. Wiener, F. P. Auteri, J. W. Chen, M. W. Brechbiel, O. A. Gansow, D. S. Schneider, R. L. Belford, R. B. Clarkson, and P. C. Lauterbur. Molecular dynamics of ion-chelate complexes attached to dendrimers. *J. Am. Chem. Soc.*, 118:7774–7782, 1996.

N. P. Benetis, D. J. Schneider, and J. H. Freed. Theory for dynamic lineshapes of strongly correlated two-spin systems. *J. Magn. Resonance*, 85:275–293, 1989.

M. Berry, D. Chen, P. Koss, D. Kuck, S. Lo, Y. Pang, L. Pointer, R. Roloff, A. Sameh, E. Clementi, S. Chin, D. Schneider, G. Fox, P. Messina, D. Walker, C. Hsiung, J. Schwarzmeier, K. Lue, S. Orszag, F. Seidl, O. Johnson, R. Goodrum, and J. Martin. The Perfect Club benchmarks - effective performance evaluation of supercomputers. *Int. J. Supercomput. Appl. High Perform. Comput.*, 3:5–40, 1989.

G. L. Millhauser, A. A. Carter, D. J. Schneider, J. H. Freed, and R. E. Oswald. Rapid singular value decomposition for time-domain analysis of magnetic-resonance signals by use of the Lanczos algorithm. *J Magn Resonance*, 82:150–155, 1989.

D. A. Cleary, Y. K. Shin, D. J. Schneider, and J. H. Freed. Rapid-determination of translational diffusion coefficients using electron spin resonance imaging. *J. Magn. Resonance*, 79:474–492, 1988.

R. E. Click, G. Cahill, D. Schneider, A. Adelmann, M. M. Azar, J. J. Tarquinio, and A. B. Peck. Nonresponsiveness to Mls^d in F_1-hybrid mice carrying Mls^a and Mls^c genes. *J. Immunol.*, 139:321–325, 1987.

K. V. Vasavada, D. J. Schneider, and J. H. Freed. Calculation of electron spin resonance spectra and related Fokker-Planck forms by the use

of the Lanczos algorithm. 2. Criteria for truncation of basis sets and recursive steps utilizing conjugate gradients. *J. Chem. Phys.*, 86:647–661, 1987.

J. P. Hornak, J. K. Moscicki, D. J. Schneider, and J. H. Freed. Diffusion coefficients in anisotropic fluids by electron spin resonance imaging of concentration profiles. *J. Chem. Phys.*, 84:3387–3395, 1986.

R. E. Click, D. Schneider, L. A. Sitzmann, and M. M. Azar. Immune-responses in vitro. 14. Undetectability of Mls^b-encoded and Mls^c-encoded products on F_1 cells possessing Mls^a or Mls^d. *Immunogenetics*, 20:301–310, 1984.

D. J. Schneider, A. L. Roe, R. J. Mayer, and L. Que. Evidence for synergistic anion binding to iron in ovotransferrin complexes from resonance Raman and extended X-ray absorption fine structure analysis. *J. Biol. Chem.*, 259:9699–9703, 1984.

A. L. Roe, D. J. Schneider, R. J. Mayer, J. W. Pyrz, J. Widom, and L. Que. X-ray absorption-spectroscopy of iron-tyrosinate proteins. *J. Am. Chem. Soc.*, 106:1676–1681, 1984.

R. E. Click, D. Schneider, and D. C. Roopenian. A new minor histocompatibility locus linked to *H-3*. *J. Immunol.*, 126:2378–2381, 1981.

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