

Frank B. Simpson

November 2009

Title of Present Position:

Honorary Fellow, Department of Biochemistry, University of Wisconsin, Room 571
Biochemistry Addition, 433 Babcock Drive, Madison, Wisconsin 53706.

Personal Data:

Born: May 12, 1951; San Jose, California.

Marital Status: Single.

Present Address: 5941 State Road 113, Waunakee, Wisconsin, USA 53597.

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Academic Training:

University of California, Davis, undergraduate study, preveterinary
medicine, Oct. 1969 - Dec. 1971.

University of California, Berkeley, B.A. Biochemistry, June 1974.

University of California, Santa Cruz, postbaccalaureate study, physics,
Jan. 1975 - March 1975.

Oregon State University, Corvallis, M.S. Biochemistry, July 1979.

University of Wisconsin-Madison, Ph.D. Biochemistry, December 1985.

Research Experience:

Undergraduate and postbaccalaureate research, Laboratory of Professor J. B.
Neilands, University of California, Berkeley, California, Jan. 1974 to
Jan. 1975.

Postbaccalaureate research, Laboratory of Dr. John R. Benemann, Sanitary
Engineering Research Laboratory, University of California, Berkeley,
California, summer and fall 1974, summer 1975.

Graduate research, Laboratory of Professor Harold J. Evans (with Professor
John R. Postgate, F.R.S.), Laboratory for Nitrogen Fixation
Research, Oregon State University, Corvallis, Oregon, March 1977 to Jan.
1979.

Graduate research, Laboratory of Professor Robert H. Burris, Department of
Biochemistry, University of Wisconsin, Madison, Wisconsin, Jan. 1979 to
Oct. 1985.

North Atlantic Treaty Organization (NATO) Postdoctoral Fellow, Laboratory of Dr.
R.N.F. Thorneley and Dr. David J. Lowe, AFRC Unit of Nitrogen Fixation,
The University of Sussex, Brighton, England, Oct. 1985 to Oct. 1986.

Postdoctoral Research Associate, Laboratory of Professor Gerald D. Watt,
University of Colorado, Boulder, Oct. 1988 to Dec. 1989, Brigham Young
University, Provo, Utah, Jan. 1990 to Oct. 1990.

Postdoctoral Research Associate, Laboratory of Professor Robert H. Burris,
Department of Biochemistry, University of Wisconsin, Madison, Oct.
1990 to Sept. 1992.

Postdoctoral Research Associate, Laboratory of Professor Dexter B.
Northrop, School of Pharmacy, University of Wisconsin, Madison, Nov.
1992 through Feb. 1998.

Assistant Scientist, Laboratory of Professor Dexter B. Northrop, School of
Pharmacy, University of Wisconsin, Madison, Mar. 1998 through June
1999; (Honorary Fellow June 1999 to September 2004); September
2004 to July 2008.

Honorary Fellow, Laboratory of Professor David L. Nelson, Department of
Biochemistry, University of Wisconsin, Madison, July 2008 to present.

Teaching Experience:

Teaching Assistant, General Chemistry 204, discussion sections and laboratories, Department of Chemistry, Oregon State University, fall quarter 1976.

Teaching Assistant, General Biochemistry 450, Department of Biochemistry, Oregon State University, fall quarter 1977.

Teaching Assistant, General Biochemistry Laboratory 651, Department of Biochemistry, University of Wisconsin, Madison, spring semester 1980.

Teaching Assistant, Introduction to Biochemistry 501, Department of Biochemistry, University of Wisconsin, Madison, fall semester 1980.

Teaching Assistant (as Postdoctor), General Biochemistry Laboratory 651, Department of Biochemistry, University of Wisconsin, Madison, spring semester 1991.

Lecturer, Pharmaceutical Biochemistry 432, School of Pharmacy, University of Wisconsin, Madison, spring semester 2000. Taught for 6 weeks, or one third of the course. My section covered amino acids and proteins. Team teaching with Professor Dexter B. Northrop and Professor Ulfert Hornemann.

Academic Honors and Scholarships:

Honors of Entrance, University of California, Davis, 1969.

Nominated to Sigma Xi, 1982.

North Atlantic Treaty Organization (NATO) Postdoctoral Fellowship in Science, 1984.

Masters Thesis:

Simpson, F. B.: Hydrogen-stimulated CO₂ fixation and coordinate derepression of hydrogenase and ribulosebisphosphate carboxylase in an H₂-uptake positive strain of Rhizobium japonicum. Oregon State University (1979); Major Professor: Dr. Harold J. Evans.

Ph.D. Thesis:

Simpson, F. B.: Experimental investigations of nitrogenase from Azotobacter vinelandii. University of Wisconsin-Madison (1985); Major Professor: Dr. Robert H. Burris.

Publications:

Simpson, F.B., Neilands, J.B.: Siderochromes in cyanophyceae: isolation and characterization of schizokinen from Anabaena sp. J. Phycol. 12, 44-48 (1976).

Maier, R.J., Campbell, N.E.R., Hanus, F.J., Simpson, F.B., Russell, S.A., Evans, H.J.: Expression of hydrogenase activity in free-living Rhizobium japonicum. Proc. Natl. Acad. Sci. USA 75, 3258-3262 (1978).

Evans, H.J., Emerich, D.W., Ruiz-Argueso, T., Albrecht, S.L., Maier, R.J., Simpson, F. Russell, S.A.: Hydrogen metabolism in legume nodules and rhizobia: some recent developments. In Hydrogenases: their catalytic activity, structure and function (H.G. Schlegel and K. Schneider, eds.) pp. 287-305, Verlag Erich Goltze KG, Gottingen (1978).

Simpson, F.B., Maier, R.J., Evans, H.J.: Hydrogen-stimulated CO₂ fixation and coordinate induction of hydrogenase and ribulosebisphosphate carboxylase in a H₂-uptake positive strain of Rhizobium japonicum. Arch. Microbiol. 123, 1-8 (1979).

Postgate, J.R., Partidge, C.D.P., Robson, R.L., Simpson, F.B., Yates, M.G.: A method for screening hydrogenase negative mutants of Azotobacter chroococcum. J. Gen. Microbiol. 128, 905-908 (1982).

Simpson, F.B., Burris, R.H.: Redox-dependence of the Shethna iron-sulfur protein II - nitrogenase interaction and the effect of high pN₂ on H₂

- evolution by nitrogenase. In Advances in nitrogen fixation research (C. Veeger and W.E. Newton, eds.) p. 243; Martinus Nijhoff/Dr W. Junk Publishers, The Hague (1984). (Published abstract).
- Simpson, F.B., Burris, R.H.: A nitrogen pressure of 50 atmospheres does not prevent evolution of hydrogen by nitrogenase. *Science* 224, 1095-1097 (1984).
- Simpson, F.B., Thiele, J., Liang, J., Burris, R.H.: I. Quantitation of the number of electrons stored by nitrogenase during the lag periods that precede formation of H₂, HD, and uptake of N₂. II. The effect of high pressures of H₂ and D₂ on HD formation by nitrogenase. In Nitrogen fixation research progress (H.J. Evans, P.J. Bottomley, and W.E. Newton, eds.) p. 614; Martinus Nijhoff Publishers, Dordrecht (1985). (Published abstract).
- Simpson, F.B.: The hydrogen reactions of nitrogenase. *Physiol. Plant.* 69, 187-190 (1987).
- Huang, H.Q., Kofford, M., Simpson, F.B., Watt, G.D.: Purification, composition, charge, and molecular weight of the FeMo cofactor from Azotobacter vinelandii nitrogenase. *J. Inorg. Biochem.* 52, 59-75 (1993).
- Northrop, D.B., Simpson, F.B.: Beyond enzyme kinetics: direct determination of mechanisms by stopped-flow mass spectrometry. *Bioorganic and Medicinal Chemistry*, 5, 641-644 (1997).
- Northrop, D.B., Simpson, F.B.: Kinetics of enzymes with iso-mechanisms: Britton induced transport catalyzed by bovine carbonic anhydrase II, measured by rapid-flow mass spectrometry. *Arch. Biochem. Biophys.* 352, 288-292 (1998).
- Simpson, F.B., Northrop, D.B.: Determination of enzyme mechanisms by stopped-flow electrospray mass spectrometry. In Mass spectrometry in biology and medicine (A.L. Burlingame, S.A. Carr, M.A. Baldwin, eds.) pp. 329-364 (2000).

Patents issued:

- Northrop, D.B., Simpson, F.B.: Enzymatic reaction mechanisms by quenched-flow mass spectrometry. Provisional U.S. patent filed March 31, 1998; Full U.S. patent filed March 30, 1999. Patent issued February 26, 2002; U.S. Patent Number 6350987.
- Simpson, F.B.: Wrap spring clutch syringe ram and frit mixer. Provisional U.S. patent filed June 13, 2000. Full patent filed in U.S.A. and also in Europe (Britain and France) June 13, 2001. U.S.A. patent issued July 25, 2006; U.S. Patent Number 7080936. European patent issued August 22, 2007; European Patent Office Number EP1179369.

Patent pending:

- Simpson, F.B., Burris, R.H., Northrop, D.B.: Method of adapting a membrane inlet mass spectrometer for rapid reactions. Provisional U.S. patent filed August 20, 1999. Full U.S. patent filed August 12, 2000.

References:

- Professor Dexter B. Northrop, School of Pharmacy, University of Wisconsin, 777 Highland Avenue, Madison, Wisconsin 53705; telephone: 608-263-2519; email: dbnorthrop@pharmacy.wisc.edu. Professor Northrop is my former employer and mentor. He specializes in kinetic theory and enzyme catalysis.
- Professor John M. Pfotenauer, Room 1329 Engineering Research Building, 1500 Engineering Drive, University of Wisconsin, Madison, Wisconsin 53706; telephone: 608-263-4082; email: pfot@engr.wisc.edu. Professor Pfotenauer

is an expert on vacuum technology and is responsible for the liquid helium facility on the University of Wisconsin campus.

Mrs. Olga Trubetskoy, Department of Comparative Biosciences, School of Veterinary Medicine, 2015 Linden Drive, Madison, Wisconsin 53706; telephone: 608-824-0419; email: trubetskoy@wisc.edu. Mrs. Trubetskoy is a gifted research colleague and presently is a lecturer of Pharmaceutical Science in the Veterinary School at the University of Wisconsin.

Professor Li Han, P.O. Box 8095, Virginia Commonwealth University - Qatar, Education City, Doha, Qatar; telephone: 011-974-503-6764; email: lihan@gatar.vcu.edu. Professor Li Han is a very intelligent graduate of the University of Wisconsin and now teaches Interior Design and computer rendering at the Virginia Commonwealth University in the country of Qatar.

Professor David L. Nelson, Department of Biochemistry, University of Wisconsin, Room 571 Biochemistry Addition, 433 Babcock Drive, Madison, Wisconsin 53706; telephone: 608-263-6879; email: nelson@biochem.wisc.edu. Professor Nelson is coauthor of a popular biochemistry textbook and is my present mentor.