The Stan Brown Lecture Series

Stan Brown was born in High River, Alberta, and attended the University of Alberta for his B.Sc. (1964-1968) where he graduated with first class standing. Following undergraduate studies, Stan headed south to the UC, San Diego where he obtained his M.Sc. and then Ph.D. in chemistry (1968-1972) with the late Teddy G. Traylor. It was here that Stan's fascination with reaction mechanisms took root as he made seminal discoveries in the 'vertical' stabilization of cations by s-bonds. Stan then moved on to the great Ronald Breslow's lab at Columbia University for postdoctoral work where he studied enzyme mimetic reactions. This would become a research theme throughout his academic career. In 1974 Stan returned to U of A to begin his independent research career where he rose to the position of full Professor in 1984. Over 21 years at U of A the Brown lab flourished, carving out major discoveries in photoelectron spectroscopy of bonding, substituent effects on ionization potentials, the hydrolysis of amides, acyl and phosphoryl transfer reactions, and enzyme model systems involving metal ions. His research also addressed the formation of the bromonium ion, and in 1994 his lab managed to obtain the X-ray crystal structure of a stable version of this iconic intermediate. In 1995 Stan was ready for a new challenge and moved his lab to Queen's University to become Head of the Department of Chemistry (1995-2001). During his time as Head, Stan further shaped the future of our department by orchestrating the hiring of Gang Wu, Hugh Horton, Hans-Peter Loock, Richard Oleschuk, Stephen Brown, Suning Wang, Natalie Cann, Victor Snieckus and Cathleen Crudden. At Queen's, Stan and his team developed a series of enzyme inspired, metal ion-based catalysts that accelerated the solvolysis of esters, amides, and phosphate esters. This discovery had immediate applications for the destruction of stockpiles of chemical warfare agents like VX and Soman, which quickly garnered the attention of the United States Army, and led to several patents. Over his research career, Stan has authored over 180 publications, 10 book chapters, and delivered more than 110 invited seminars. Stan holds a tremendous record of service in the Chemistry community, which has won him many awards over the years, including two Killam awards, the Syntex Award (CSC), the Alfred Bader Award (CSC), the Queen's Chemistry 'Prof of the Year', the Queen's University Prize, the Queen's University Award for Excellence in Graduate Student Supervision (2016), the R.U. Lemieux Award (CSC), the Montreal Medal (CIC), and the Catalysis Award (CIC). Stan is a fellow of the Chemical Institute of Canada, the Royal Society of Canada, and the International Union of Pure and Applied Chemistry.

SELECTED RECENT PUBLICATIONS

• Esakova, O. A.; Grove, T. L.; Yennawar, N. H.; Arcinas, A. J.; Wang, B.; Krebs, C.; Almo, S. C.; Booker, S. J. Structural basis for tRNA methylthiolation by the radical SAM enzyme MiaB. *Nature* **2021**, *597*, 566-570.

•Knox, H.L.; Chen, P.YT.; Blaszczyk, A.J.; Mukherjee, A.; Grove, T. L.; Schwalm, E. L.; Wang, B.; Drennan, C. L.; Booker, S. J. Structural basis for non-radical catalysis by TsrM, a radical SAM methylase. *Nat. Chem. Biol.* **2021**, *17*, 485-491.

•Zhang, B.; Arcinas, A. J.; Radle, M. I.; Silakov, A.; Booker, S. J.; Krebs, C. First Step in Catalysis of the Radical S-Adenosylmethionine Methylthiotransferase MiaB Yields an Intermediate with a [3Fe-4S]0-Like Auxiliary Cluster. *J. Am. Chem. Soc.* **2020**, *142*, 1911-1924.

•Wang, B.; LaMattina, J. W.; Marshall, S. L.; Booker, S. J. Capturing Intermediates in the Reaction Catalyzed by NosN, a Class C Radical S -Adenosylmethionine Methylase Involved in the Biosynthesis of the Nosiheptide Side-Ring System. *J. Am. Chem. Soc.* **2019**, *141*, 5788-5797.

PREVIOUS DR. STAN BROWN LECTURERS

2024 • K. Plaxco

2023 • J. W. Keillor

2023 • R. J. M. Goss

2020 • P. Schreiner

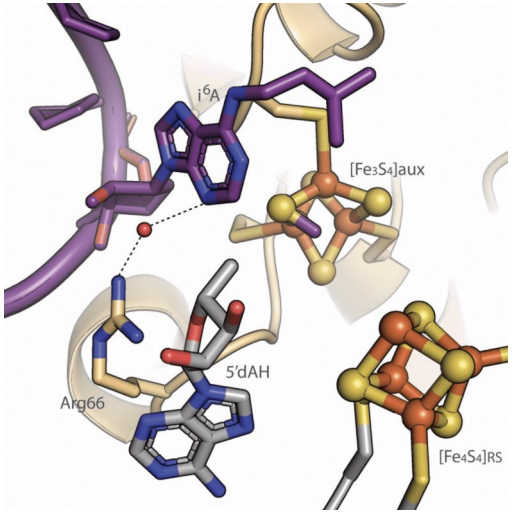
Queen's Chemistry

The Department of Chemistry, Queen's University

is honoured to host the 2024 Robert S. Brown Lecture:

Dr. Squire J. Booker
Pennsylvania State University

"Biochemical and Structural Basis for Transfer RNA Methylthiolation by the Radical Sadenosylmethionine Enzyme MiaB"



Friday, May 3, 2024
11:30 AM
Room 117, Chernoff Hall

DR. SQUIRE J. BOOKER

Squire J. Booker
Howard Hughes Medical Investigator
Evan Pugh University Professor of Chemistry,
Biochemistry and Molecular Biology
Eberly Distinguished Chair in Science
302 Chemistry Building
University Park, PA 16802
Email: sjb14@psu.edu

Squire J. Booker is an Evan Pugh Professor of Chemistry and of Biochemistry and Molecular Biology, and the Eberly Family Distinguished Chair in Science at the Pennsylvania State University. He is also an investigator of the Howard Hughes Medical Institute. He received a B.A. degree with a concentration in chemistry from Austin College in 1987 and a Ph.D. in biochemistry from the Massachusetts Institute of Technology in 1994, where he was supervised by Prof. JoAnne Stubbe. He received an NSF–NATO postdoctoral fellowship to study at the Université René Descartes in Paris, France under the supervision of Dr. Daniel Mansuy, and then an NIH postdoctoral fellowship to study at the Institute for Enzyme Research at the University of Wisconsin under the supervision of Prof. Perry Frey. He joined the faculty at Penn State in 1999, and was promoted to Associate Professor in 2005, Professor in 2013, Eberly Family Distinguished Chair in Science in 2017, and Evan Pugh Professor in 2018.

Booker's research focuses on the enzymology of natural product biosynthesis, with a particular interest in the methylation or sulfidation of unactivated carbon centers, and the use of S-adenosylmethionine and iron-sulfur clusters in enzyme catalysis. In addition to his scientific endeavors, he is heavily involved in the mentoring of young scientists, and particularly those that come from groups that are historically underrepresented in the sciences. Currently, he is the PI on an NSF award entitled "Interactive Mentoring And Grantsmanship Enhancement," which seeks to demystify the grant-writing process for early stage investigators. Among other awards, Booker received a CAREER award from the National Science Foundation, a Presidential Early Career Award in Science and Engineering (PECASE), and an ACS Cope Scholar award. He was elected a fellow of the American Association for the Advancement of Science in 2013, a member of the American Academy of Arts and Sciences in 2017, and a member of the National Academy of Sciences in 2019.

SELECTED HONOURS & AWARDS

- The Protein Society's Hans Neurath Award (2022)
- Inaugural Fellow of the American Society for Biochemistry and Molecular Biology (2021)
- Fellow of the National Academy of Sciences (2019)
- Eyring/Miner Lectureship, University of Utah (2019)
- Wriston Lectureship, University of Delaware (2019)
- Gomberg Lectureship, University of Michigan (2018)
- Member of the American Academy of Arts and Sciences (2017)
- Howard Hughes Medical Investigator (2015)
- Fellow of the American Association for the Advancement of Science (2013)
- Arthur C. Cope Scholar Award (2011)
- Presidential Early Career Award for Scientists and Engineers (2004)
- National Science Foundation Faculty Early Career Development Award (2002)