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PREFACE TO *HETEROCYCLES* ISSUE

HONORING THE 77TH BIRTHDAY OF PROFESSOR EI-ICHI NEGISHI

It is both a considerable pleasure and great honor to acknowledge the many achievements of Professor **Ei-ichi Negishi** of Purdue University's Department of Chemistry and to participate in the celebration of his 77th birthday, a special milestone in the Japanese culture. I was an undergraduate student (the first I believe) with Professor Negishi when he had just started his independent academic career at Syracuse University. I had the privilege of being introduced to synthetic organic chemistry, laboratory research and the scientific method by Professor Negishi when his fledgling lab was only constituted of a single post-doctoral fellow (Dr. Takao Yoshida) and one graduate student (George Lew). I published my first paper with Professor Negishi in the *Journal of the American Chemical Society* in 1974 entitled "A Stereoselective Synthesis of 1,2,3-Butatriene Derivatives via Hydroboration". It is truly astounding to have experienced the genesis and development of his spectacular career in synthetic organic chemistry and to here acknowledge his many contributions to our science that have had such a tremendous impact. Professor Negishi has risen to be one of the true giants in synthetic methodology and organometallic chemistry and this special issue of *Heterocycles*, honoring his 77th birthday and for his being recognized as a recipient of the 2010 Nobel Prize in Chemistry, is both timely and highly appropriate.

Ei-ichi Negishi was born on July 14, 1935 in Changchun, China as a Japanese citizen, the only son in a family of six children. His family moved to Harbin when he was one year old and the family then moved to Seoul, Korea, two years before the end of World War II. He was admitted to elementary school in Harbin at age six, one year earlier than normal and was a third grade student when he moved to Korea at age eight. Just after the second world war ended, his family returned to Japan and lived in a house in Tokyo that they had purchased years earlier, that had miraculously survived numerous bombings during the war. The family then settled in a naturally wooded area called "Rinkan" in Yamato, Kanagawa Prefecture, where he spent his junior high school, high school (graduating at the top of his class), and college years. Ei-ichi Negishi entered Tokyo University in 1953 and graduated in 1958 with a bachelor's degree in Engineering. He then worked as a research chemist at the Iwakuni Research Labs, which was the main research facility of Teijin Co. Prof. Negishi was at that time, mainly interested in polymer chemistry and was charged at Teijin, to systematically explore chemical reactions of polymers to come up

with modified polymers with superior properties. This challenge, put him face-to-face with the field of synthetic organic chemistry, which drew him inexorably, to go back to graduate school and hone his skills and knowledge in synthetic organic chemistry. He took a conversational English-speaking class given by a tutor recently hired at Teijin that proved crucial in his path to coming to the United States. He won a Fulbright-Smith-Mund Scholarship in 1960 and entered graduate school at the University of Pennsylvania and obtained his Ph.D. degree in just three years under Professor A.R. Day. In Professor Negishi's autobiography, he states that: "Looking back, I consider my winning a Fulbright-Smith-Mund All-Expense Scholarship to come to the U.S. in 1960 and study toward my Ph.D. degree in Synthetic Organic Chemistry to be the single most important turning point in my professional career." After obtaining his doctoral degree at Penn, he joined H.C. Brown's laboratory as a post-doctoral fellow in 1966 for two years and then stayed four more years as Prof. Brown's assistant with the rank of an instructor. During his tenure in the Brown laboratory, he worked mainly in the area of organoboron chemistry. He was given considerable freedom to pursue his own research interests during these last four years in the Brown laboratory, and it was at this time, that he became interested in the possible uses of *d*-block transition metals as catalysts for promoting main-group metal-containing organometallic reactions. He then moved to Syracuse University in 1972 to start his independent career as an Assistant Professor. After achieving tenure, he was quickly recruited back to Purdue in 1979 (the same year that Prof. Brown was awarded the Nobel Prize in Chemistry) where he has remained ever since and was named the inaugural H.C. Brown Distinguished Professor of Chemistry in 1999, which is his current position. While at Syracuse University, he first started branching out into transition metal chemistry that led to his interests in transition metal-catalyzed cross-coupling reactions that eventually evolved into his discovery of the zinc-based palladium-catalyzed cross-coupling reaction for synthesizing stereo-defined alkenes and became known as the "Negishi Cross-Coupling Reaction". He also discovered a zirconium-catalyzed carboalumination reaction and several other important transition metal-catalyzed processes that have had a tremendous impact in the field of synthetic organic chemistry.

His work has been recognized with many awards, the most noteworthy of which are the Guggenheim Fellowship (1987), the Chemical Society of Japan Award (1996), the American Chemical Society Award for Organometallic Chemistry (1998), the Alexander von Humboldt Senior Researcher Award (1998-2001), the Sigma Xi Award, Purdue University (2003), the Yamada-Koga Prize (2007), the American Chemical Society Award for Creative Work in Synthetic Organic Chemistry (2010), The Order of Culture, Japan (2010), The Order of Griffin (2010), and the Nobel Prize in Chemistry (2010). The 2010 Nobel Prize in Chemistry was "*for palladium-catalyzed cross couplings in organic synthesis*" and was shared with Prof. Negishi by Richard F. Heck (University of Delaware), and Akira Suzuki (Hokkaido University, Japan). Shortly after receiving the Nobel Prize in Chemistry, he was appointed as Executive Research

Advisor to Sony Corporation in the field of Organic Electronics (December 13, 2010) and Permanent Research Fellow, Teijin Ltd. (January, 2011). He was also named as a Distinguished Visiting Professor at Hokkaido University Catalysis Research Center in October of 2010. He has received Honorary Doctorate Degrees from the University of Pennsylvania, Syracuse University, Purdue University, Okayama University, and the University of Tokyo.

The Negishi cross-coupling reaction, among one of his many discoveries in the area of organometallic chemistry, has paved the way for important future advancements in reaction technology, new methods, and strategic thinking. These pioneering contributions and aspects of Negishi's work must not be lost upon our community, nor the next generation of organic chemists and richly merits the multitude of recognition he has recently enjoyed. Professor Negishi celebrates his 77th anniversary this year, which is known as “kiju” or good fortune in the Japanese culture. It is a tremendous pleasure to wish him well and to acknowledge his many contributions to chemistry through this special issue of *Heterocycles*.



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Robert M. Williams was born in New York (1953) and attended Syracuse University obtaining a B.A. in Chemistry (1975; Professor Ei-ichi Negishi undergraduate research advisor). He obtained the Ph.D. degree in 1979 at MIT under the direction of Professor W.H. Rastetter and was a post-doctoral fellow at Harvard (1979-1980; Professor R.B. Woodward; Professor Yoshito Kishi). He joined Colorado State University in 1980 and was named University Distinguished Professor in 2002. Co-author of more than 280 publications, his interdisciplinary research program at the chemistry-biology interface concerns the total synthesis and biosynthesis of biomedically significant natural products, antitumor drug-DNA interactions, histone deacetylase inhibitors, heterocycles, the asymmetric synthesis of amino acids, and peptides. He has been recognized with several honors and awards including the NIH Research Career Development Award (1984); Eli Lilly Young Investigator Award (1986); Alfred P. Sloan Foundation Fellowship (1986); Merck, Academic Development Award (1991); Japanese Society for the Promotion of Science Fellowship (1999), Arthur C. Cope Scholars Award (2002), the ACS Ernest Guenther Award in the Chemistry of Natural Products (2011) and the Japanese Society for the Promotion of Science Long-term Fellowship (2012-2013). Co-founder of five biopharmaceutical companies, he is currently the Director of the Colorado Center for Drug Discovery.