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*Improving Efficiency via Catalytic
and Multicatalytic Reactions*

Mark Lautens, PhD

*J. Bryan Jones Distinguished Professor
AstraZeneca Professor of Organic Chemistry
NSERC/Merck-Frosst Industrial Research Chair
University of Toronto
Department of Chemistry
Toronto, Ontario, Canada*

**4:00 p.m. Monday March 13th, 2017
Wolfe Hall 1205**



Mark Lautens

Mark Lautens was born in Hamilton, Ontario, Canada. He attended the University of Guelph where he worked with G.L. Lange and P.M. Henry. He also spent a summer at Xerox Research Centre of Canada. In 1981 he entered the University of Wisconsin-Madison where he obtained a PhD with Barry M. Trost in 1985 following studies on molybdenum catalyzed alkylations and the palladium enyne reaction. He conducted postdoctoral studies at Harvard with D.A. Evans on a total synthesis of bryostatatin. All work was supported by NSERC.

In 1987 he was appointed to the University of Toronto as an NSERC URF assistant professor and was promoted to professor in 1995. Since 1998 he has held the AstraZeneca Chair in organic synthesis. From 2003–2013 he has held an NSERC/Merck Frosst Industrial Research Chair on “New Medicinal Agents via Catalytic Reactions”. In 2012 he was appointed as “University Professor” the highest rank awarded at the University of Toronto. In 2013 he was appointed as J. Bryan Jones Distinguished Professor.

He has been selected for various national and international awards including an A.P. Sloan Fellow, Eli Lilly Grantee, A.C. Cope Scholar, Pedler Award, Alexander von Humbolt Award, Solvias Prize, Alfred Bader Award, R.U. Lemieux Award, E.W.R. Steacie Award, BioMega Young Investigator and Merck Frosst Award. In 2001 he was elected to the Royal Society of Canada. In 2014 Prof. Lautens was made an Officer of the Order of Canada, Canada's

highest civilian honor. He was also awarded an honorary doctorate (Doctor of Science) from his alma mater the University of Guelph.

The Lautens group is focused on the investigation and development of novel transition-metal-mediated organic transformations. Some projects include catalyst-controlled asymmetric transformations while others focus on controlled tandem or domino processes.

Of particular interest are reactions which can efficiently construct frameworks of pharmaceutical compounds or fragments of biologically-active natural products.

Selected Recent Scientific Contributions

1. "Employing Pd-Catalyzed C-H Arylation in Multicomponent-Multicatalyst Reactions (MC)²R: One-Pot Synthesis of Dihydrobenzoquinolines" Lied, F.; Žugelj, H. B.; Kress, S.; Štefane, B.; Glorious F.; Lautens, M. *ACS Catal.* **2017**, *7*, 1378-1382.
2. "Modern Transition-Metal-Catalyzed Carbon-Halogen Bond Formation" Petrone, D. A.; Ye, J.; Lautens, M. *Chem. Rev.* **2016**, *116*, 8003-8104.
3. "An Exclusively *trans*-Selective Chlorocarbonylation of Alkynes Enabled by a Palladium/Phosphaadamantane Catalyst" Le, C. M.; Hou, X.; Sperger, T.; Schoenebeck, F.; Lautens, M. *Angew. Chem. Int. Ed.* **2015**, *54*, 15897-15900.
4. "Palladium-Catalyzed Norbornene-Mediated C-H Functionalization of Arenes" Ye, J.; Lautens, M. *Nature Chem.* **2015**, *7*, 863-870.
5. "Additive Effects in the Palladium-Catalyzed Carboiodination of Chiral N-Allyl Carboxamides" Petrone, D. A.; Yoon, H.; Weinstabl, H.; Lautens, M. *Angew. Chem. Int. Ed.* **2014**, *53*, 7908.
6. "Harnessing Reversible Oxidative Addition: Application of Diiodinated Aromatic Compounds in the Carboiodination Process" Petrone, D. A.; Lischka, M.; Lautens, M. *Angew. Chem. Int. Ed.* **2013**, *52*, 10635-10638.
7. "A Conjunctive Carboiodination: Indenes by a Double Carbopalladation-Reductive Elimination Domino Process" Jia, X.; Petrone, D. A.; Lautens, M. *Angew. Chem. Int. Ed.* **2012**, *51*, 9870-9872.
8. "Domino Rhodium-Catalyzed Alkyne Arylation/Palladium-Catalyzed N Arylation: A Mechanistic Investigation" Panteleev, J.; Zhang, L.; Lautens, M. *Angew. Chem. Int. Ed.* **2011**, *50*, 9089-9092.
9. "Palladium-Catalyzed Carbohalogenation: Bromide to Iodide Exchange and Domino Processes" Newman, S. G.; Howell, J. K.; Nicolaus, N.; Lautens, M. *J. Am. Chem. Soc.* **2011**, *133*, 14916-14919.
10. "Palladium-Catalyzed Carboiodination of Alkenes: Carbon-Carbon Bond Formation with Retention of Reactive Functionality" Newman, S. G.; Lautens, M. *J. Am. Chem. Soc.* **2011**, *133*, 1778-1780.

11. "The Role of Reversible Oxidative Addition in Selective Palladium(0)-Catalyzed Intramolecular Cross-Couplings of Polyhalogenated Substrates: Synthesis of Brominated Indoles" Newman, S. G.; Lautens, M. J. *Am. Chem. Soc.* **2010**, *132*, 11416-11417.

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