

## TOMISLAV ROVIS

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### ***Personal***

*Place and Date of Birth* Zagreb, Yugoslavia, July 2, 1968  
*Nationality* Canadian  
*Status* Permanent resident, U.S.

### ***Academic Positions and Education***

2008-present John K. Stille Chair  
Department of Chemistry, Colorado State University, Fort Collins, CO

2008-present Professor  
Department of Chemistry, Colorado State University, Fort Collins, CO

2005-2008 Associate Professor  
Department of Chemistry, Colorado State University, Fort Collins, CO

2000-2005 Assistant Professor  
Department of Chemistry, Colorado State University, Fort Collins, CO

1998-2000 NSERC Post-Doctoral Research Fellow  
Harvard University, Cambridge, Massachusetts *with* Prof. David A. Evans

1993-1998 Ph.D. Organic Chemistry  
University of Toronto, Toronto, Ontario *with* Prof. Mark Lautens

1986-1990 B.Sc. Human Biology  
University of Toronto, Toronto, Ontario

### ***Awards and Honors***

2008- John K. Stille Chair in Chemistry  
2007-2012 Herman Frasch Foundation Grantee  
2005-2007 Monfort Professor  
2005 Alfred P. Sloan Fellow  
2005 Boehringer-Ingelheim Research Awardee  
2004 Amgen Young Investigator  
2004 Johnson & Johnson Focused Giving Grantee  
2004 Eli Lilly Grantee

2003 NSF CAREER Awardee  
2003 GlaxoSmithKline Scholar  
2000-2004 Merck Research Laboratories Unrestricted Grant Recipient

### **Publications**

#### *Ph.D./Postdoc:*

1. "Nickel-Catalyzed Hydroalumination of Oxabicyclic Alkenes. Ligand Effects on the Regio- and Enantioselectivity." M. Lautens\*, P. Chiu, S. Ma, T. Rovis, *J. Am. Chem. Soc.* **1995**, *117*, 532.
2. "A General Strategy Toward the Tetrahydronaphthalene Skeleton. An Expedient Total Synthesis of Sertraline." M. Lautens\* and T. Rovis, *J. Org. Chem.* **1997**, *62*, 5246.
3. "A New Route to the Enantioselective Synthesis of Cycloheptenols. Temperature Effects in the Asymmetric Reductive Ring Opening of [3.2.1] Oxabicycloalkenes." M. Lautens\* and T. Rovis, *J. Am. Chem. Soc.* **1997**, *119*, 11090.
4. "Scope of the Nickel Catalyzed Asymmetric Reductive Ring Opening Reaction. Synthesis of Enantiomerically Enriched Cyclohexenols." M. Lautens\* and T. Rovis, *Tetrahedron* **1998**, *54*, 1107.
5. "Metal Catalyzed Hydrometalations and their Applications in Synthesis." M. Lautens\*, T. Rovis, N. D. Smith, D. Ostrovsky, *Pure & Appl. Chem.* **1998**, *70*, 1059.
6. "Enantioselective Hydroalumination." M. Lautens\* and T. Rovis, *Comprehensive Asymmetric Catalysis* ed. by E. N. Jacobsen, A. Pfaltz, H. Yamamoto. **1999**, 337.
7. "Selective Functionalization of 1,2-Dihydronaphthalenols Leads to a Concise, Stereoselective Synthesis of Sertraline." M. Lautens\* and T. Rovis, *Tetrahedron* **1999**, *55*, 8967.
8. "C<sub>2</sub>-Symmetric Cu(II) Complexes as Chiral Lewis Acids. Catalytic Enantioselective Michael Addition of Silylketene Acetals to Alkylidene Malonates." D. A. Evans\*, T. Rovis, M. C. Kozłowski, J. S. Tedrow, *J. Am. Chem. Soc.* **1999**, *121*, 1994.
9. "Chiral Copper(II) Complexes as Lewis Acids for Catalyzed Cycloaddition, Carbonyl Addition, and Conjugate Addition Reactions." D. A. Evans\*, T. Rovis, J. S. Johnson, *Pure & Appl. Chem.* **1999**, *71*, 1407.
10. "Rhodium Catalyzed Asymmetric Alcoholysis and Aminolysis of Oxabenzonorbornadiene: A New Enantioselective Carbon-Heteroatom Bond Forming Process." M. Lautens\*, K. Fagnou, T. Rovis, *J. Am. Chem. Soc.* **2000**, *122*, 5650.
11. "Enantioselective Mukaiyama Michael Reactions of Alkylidene Malonates. C<sub>2</sub>-Symmetric Bis(oxazoline) Copper (II) Complexes in the Synthesis of Chiral,

- Differentiated Glutarate Esters." D. A. Evans\*, T. Rovis, M. C. Kozlowski, C. W. Downey, J. S. Tedrow, *J. Am. Chem. Soc.* **2000**, *122*, 9134.
12. "Mechanistic and Structural Investigations in Asymmetric Cu(I) and Cu(II) Catalyzed Reactions." T. Rovis\* and D. A. Evans, *Prog. Inorg. Chem.* **2001**, *50*, 1.
13. "Rhodium-Catalysed Asymmetric Ring Opening of Oxabicyclic Alkenes with Heteroatom Nucleophiles." M. Lautens\*, K. Fagnou, M. Taylor, T. Rovis. *J. Organomet. Chem.* **2001**, *624*, 259.
14. "Highly Enantioselective Syntheses of Homopropargylic Alcohols and Dihydrofurans Catalyzed by a Bis(oxazoliny)pyridine – Scandium Triflate Complex." D. A. Evans\*, Z. K. Sweeney, T. Rovis, J. S. Tedrow, *J. Am. Chem. Soc.* **2001**, *123*, 12095.

*Independent:*

1. "A Mild and Efficient Catalytic Alkylative Monofunctionalization of Cyclic Anhydrides." E. A. Bercot and T. Rovis\*. *J. Am. Chem. Soc.* **2002**, *124*, 174.
2. "Stereoretentive O-to-C Rearrangement of Vinyl Acetals. Solvent Cage Effects as a Stereocontrol Element." Y. Zhang, N. T. Reynolds, K. Manju and T. Rovis\*. *J. Am. Chem. Soc.* **2002**, *124*, 9720.
3. "A Highly Enantioselective Catalytic Intramolecular Stetter Reaction." M. S. Kerr, J. Read de Alaniz and T. Rovis\*. *J. Am. Chem. Soc.* **2002**, *124*, 10298.
4. "Decarbonylative Cross-coupling of Cyclic Anhydrides: Introducing Stereochemistry at an sp<sup>3</sup>-Carbon in the Cross-coupling Event." E. M. O'Brien, E. A. Bercot and T. Rovis\*. *J. Am. Chem. Soc.* **2003**, *125*, 10498.
5. "Metal and Non-metal Catalysts for Carbon-carbon Bond-Forming Reactions Leading to Desymmetrized 1,4-dicarbonyl Compounds." T. Rovis, *Chemtracts: Org.* **2003**, *16*, 542.
6. "1,3-Polyol Arrays via the Stereoselective Rearrangement of Vinyl Acetals." Y. Zhang and T. Rovis\*. *Tetrahedron* **2003**, *59*, 8979-8987.
7. "Effect of the Michael Acceptor in the Asymmetric Intramolecular Stetter Reaction." M. S. Kerr and T. Rovis\*. *Synlett* **2003**, 1934-1936.
8. "The Use of Acid Fluorides Increases the Scope of the Reductive Acylation of Esters." Y. Zhang and T. Rovis\*. *Org. Lett.* **2004**, *6*, 1877-1879.
9. "Enantioselective Synthesis of Quaternary Stereocenters via a Catalytic Enantioselective Stetter Reaction." M. S. Kerr and T. Rovis\*. *J. Am. Chem. Soc.* **2004**, *126*, 8876-8877.

10. "Conversion of  $\alpha$ -Haloaldehydes into Acylating Agents Catalyzed by Nucleophilic Carbenes." N. T. Reynolds, J. Read de Alaniz, T. Rovis\*. *J. Am. Chem. Soc.* **2004**, *126*, 9518-9519.
11. "A Palladium Catalyzed Enantioselective Alkylative Desymmetrization of *meso*-Succinic Anhydrides." E. A. Bercot and T. Rovis\*. *J. Am. Chem. Soc.* **2004**, *126*, 10248-10249.
12. "Recent Advances in Catalytic Asymmetric Desymmetrization Reactions." T. Rovis. Invited Chapter in *New Frontiers in Asymmetric Catalysis*, Koichi Mikami and Mark Lautens, eds.
13. "A Unique Catalyst Effects the Rapid Room Temperature Cross-coupling of Organozinc Reagents with Carboxylic Acid Fluorides, Chlorides, Anhydrides and Thioesters." Y. Zhang and T. Rovis\*. *J. Am. Chem. Soc.* **2004**, *126*, 15964-15965.
14. "Highly Efficient Nickel-Catalyzed Cross-coupling of Succinic and Glutaric Anhydrides with Organozinc Reagents." E. A. Bercot and T. Rovis\*. *J. Am. Chem. Soc.* **2005**, *127*, 247-254.
15. "Complementary Diastereoselective Reduction of Cyclic  $\gamma$ -Keto Acids: Efficient Access to Trisubstituted  $\gamma$ -Lactones" E. A. Bercot, D. E. Kindrachuk, T. Rovis\*. *Org. Lett.* **2005**, *7*, 107-110.
16. "Anxiolytic Actions of Estrogen are mediated by Estrogen Receptor Beta." Trent D. Lund\*, Tomislav Rovis, W. C. J. Chung, Robert J. Handa\*. *Endocrinology*, **2005**, *146*, 797-807.
17. "The Effect of Preexisting Stereocenters in the Intramolecular Asymmetric Stetter Reaction." N. T. Reynolds and T. Rovis\*. *Tetrahedron*, **2005**, *61*, 6368-6378.
18. "Stereoselective Lewis Acid-Mediated [1,3] Ring Contraction of 2,5-Dihydrooxepins as a Route to Polysubstituted Cyclopentanes." C. G. Nasveschuk and T. Rovis\*. *Angew. Chem. Int. Edit.* **2005**, *44*, 3264-3267.
19. "A Highly Enantio- and Diastereoselective Catalytic Intramolecular Stetter Reaction." J. Read de Alaniz and T. Rovis\*. *J. Am. Chem. Soc.* **2005**, *127*, 6284-6289.
20. "Regioselective Lewis Acid-Mediated [1,3] Rearrangement of Allylvinyl Ethers." C. G. Nasveschuk and T. Rovis\*. *Org. Lett.* **2005**, *7*, 2173-2176.
21. "Surveying approaches to the formation of carbon-carbon bonds between a pyran and an adjacent ring." J. D. Frein and T. Rovis\*. *Tetrahedron* **2006**, *62*, 4573-4583.

22. "An Improved Synthesis of Achiral and Chiral 1,2,4-Triazolium Salts: Bench Stable Precursors for N-Heterocyclic Carbenes." M. S. Kerr, J. Read de Alaniz, T. Rovis\*. *J. Org. Chem.* **2005**, *70*, 5725-5728.
23. "Enantioselective Protonation of Catalytically Generated Chiral Enolates as an Approach to the Synthesis of  $\alpha$ -Chloroesters." N. T. Reynolds and T. Rovis\*. *J. Am. Chem. Soc.* **2005**, *127*, 16406-16407.
24. "Rhodium-Catalyzed [2+2+2] Cycloaddition of Alkenyl Isocyanates and Alkynes." R. T. Yu and T. Rovis\*. *J. Am. Chem. Soc.* **2006**, *128*, 2782-2783.
25. "Asymmetric Synthesis of Hydrobenzofuranones via Desymmetrization of Cyclohexadienones Using the Intramolecular Stetter Reaction." Q. Liu and T. Rovis\*. *J. Am. Chem. Soc.* **2006**, *128*, 2552-2553.
26. "Enantioselective Formation of Quaternary Stereocenters using the Catalytic Intramolecular Stetter Reaction." J. L. Moore, M. S. Kerr, T. Rovis\*. *Tetrahedron* **2006**, *62*, 11477-11482.
27. "A Modular Approach to 2,3,4-Trisubstituted Tetrahydrofurans." C. G. Nasveschuk, N. T. Jui, T. Rovis\*. *Chem. Commun.* **2006**, 3119-3121.
28. "Selective Substituent Transfer from Mixed Zinc Reagents in Ni-Catalyzed Anhydride Alkylation." J. B. Johnson, R. T. Yu, P. Fink, E. A. Bercot, T. Rovis\*. *Org. Lett.* **2006**, *8*, 4307-4310.
29. "Enantioselective Rhodium-Catalyzed [2 + 2 + 2] Cycloaddition of Alkenyl Isocyanates and Terminal Alkynes: Application to the Total Synthesis of (+)-Lasubine II." R. T. Yu and T. Rovis\*. *J. Am. Chem. Soc.* **2006**, *128*, 12370-12371.
30. "A Sakurai – Prins – Ritter Sequence for the Three-Component Diastereoselective Synthesis of 4-Amino Tetrahydropyrans." O. L. Epstein and T. Rovis\*. *J. Am. Chem. Soc.* **2006**, *128*, 16480-16481.
31. "Ligand Dependent Catalytic Cycle and Role of Styrene in Nickel-Catalyzed Anhydride Cross-Coupling: Evidence for Turnover Limiting Reductive Elimination." J. B. Johnson, E. A. Bercot, J. M. Rowley, G. W. Coates and T. Rovis\*. *J. Am. Chem. Soc.* **2007**, *129*, 2718-2725.
32. "Enantioselective Synthesis of Hydrobenzofuranones Using an Asymmetric Desymmetrizing Intramolecular Stetter Reaction of Cyclohexadienones." Q. Liu and T. Rovis\*. *Org. Proc. Res. Dev.* **2007**, *11*, 598-604.
33. "A Concise Synthesis of Eupomatilones 4, 6, and 7 via Rhodium-Catalyzed Enantioselective Desymmetrization of Cyclic meso-Anhydrides with in situ-Generated

- Organozinc Reagents.” J. B. Johnson, E. A. Bercot, C. M. Williams, T. Rovis\*. *Angew. Chem. Int. Edit.* **2007**, *46*, 4514.
34. "More than Bystanders: The Effect of Olefins on Transition Metal-Catalyzed Cross-Coupling Reactions." J. B. Johnson, T. Rovis\*. *Angew. Chem. Int. Edit.* **2008**, *47*, 840-871. (Review)
35. "6,7-Dihydro-2-phenyl-5-(phenylmethyl)-5H-pyrrolo[2,1-c]-1,2,4-triazolium chloride". T. Rovis *Electronic Encyclopedia of Reagents for Organic Synthesis*, **2006**.
36. "Rhodium Catalyzed Enantioselective Desymmetrization of meso-3,5-Dimethyl Glutaric Anhydride: A General Strategy to syn-Deoxypolypropionate Synthons". M. J. Cook, T. Rovis\*. *J. Am. Chem. Soc.* **2007**, *129*, 9302-9303.
- Chosen as a *Synfact* of the month for October 2007 (*Synfacts* **2007**, 1053)
  - Highlighted in *Chemistry and Industry* (*Chem. & Ind.* **2007**, *16*, 29-30)
  - Highlighted in *Synform* (*Synform* **2007**, A81)
37. "Enantioselective Cross-Coupling of Anhydrides with Organozinc Reagents: The Controlled formation of Carbon-Carbon Bonds through the Nucleophilic Interception of Metalacycles". J. B. Johnson, T. Rovis\*. *Acc. Chem. Res.* **2008**, *41*, 327-338.
38. "Nucleophilic Carbene and HOAt Relay Catalysis in a Waste Free Amide Bond Coupling: An Orthogonal Peptide Bond Forming Reaction." H. U. Vora and T. Rovis\*. *J. Am. Chem. Soc.* **2007**, *129*, 13796-13797.
39. "A Rapid Total Synthesis of (+/-)-Sylvone." C. G. Nasveschuk and T. Rovis\*. *Synlett*, **2008**, 126-128.
40. "Alkene-Directed Regioselective Nickel-Catalyzed Cross-Coupling of Cyclic Anhydrides with Diorganozinc Reagents." R. L. Rogers, J. L. Moore, T. Rovis\*. *Angew. Chem. Int. Edit.* **2007**, *47*, 9301-9304.
41. "A Diastereoselective Ring Contraction of 1,3-Dioxepins to 2,3,4-Trisubstituted and Tetrasubstituted Tetrahydrofurans." C. G. Nasveschuk and T. Rovis\*. *J. Org. Chem.* **2008**, *73*, 612-617.
42. "A Diastereoselective Intermolecular Heck Reaction of 1,3-Dioxepins." C. G. Nasveschuk, J. D. Frein, N. T. Jui, T. Rovis\*. *Org. Lett.* **2007**, *9*, 5099-5102.
43. "The [1, 3] O to C Rearrangement: Opportunities for Stereoselective Synthesis." C. G. Nasveschuk and T. Rovis\*. *Org. Biomol. Chem.* **2008**, *6*, 240 - 254. (Review)
44. "Development of Chiral Bicyclic Triazolium Salt Organic Catalysts: The Importance of the N-Aryl Substituent." T. Rovis. *Chem. Lett.* **2008**, 2-7. (Review)

45. "Towards the Total Synthesis of FD-838: Modular Enantioselective Assembly of the Core." A. Orellana and T. Rovis\*. *Chem. Commun.* **2008**, 730-732.
46. "Enantioselective Synthesis of Indolizidines Bearing Quaternary Substituted Stereocenters via Rhodium-Catalyzed [2+2+2] Cycloaddition of Alkenyl Isocyanates and Terminal Alkynes." E. E. Lee and T. Rovis\*. *Org. Lett.* **2008**, *10*, 1231-1234.
  - *Highlighted in: Synfacts* **2008**, 573.
47. "Asymmetric Synthesis of Bicyclic Amidines via Rhodium-Catalyzed [2 + 2 + 2] Cycloaddition of Carbodiimides." R. T. Yu and T. Rovis\*. *J. Am. Chem. Soc.* **2008**, *130*, 3262-3263.
48. "Catalytic Asymmetric Stetter Reaction Onto Vinylphosphine Oxides and Vinylphosphonates." S. C. Cullen and T. Rovis\*. *Org. Lett.* **2008**, *10*, 3141-3144.
49. "Scope of the Asymmetric Intramolecular Stetter Reaction Catalyzed by Chiral Nucleophilic Triazolinyliene Carbenes." J. Read de Alaniz, M. S. Kerr, J. L. Moore, T. Rovis\*. *J. Org. Chem.* **2008**, *73*, 2033-2040.
  - *Among Most-Accessed Articles: January-March 2008*
50. "Lewis Base Catalysts 6: Carbene Catalysts." J. L. Moore, T. Rovis\*. *Top. Curr. Chem.* In press.
51. "Catalytic Asymmetric Intermolecular Stetter Reaction of Glyoxamides with Alkylidenemalonates." Q. Liu, S. Perreault, T. Rovis\*. *J. Am. Chem. Soc.* **2008**, *130*, 14066-14067.
52. "The Catalytic Asymmetric Intramolecular Stetter Reaction." J. Read de Alaniz, T. Rovis\*. *Synlett*, **2009**, 1189-1207.
53. "Nickel-Catalyzed Reductive Carboxylation of Styrenes Using CO<sub>2</sub>." C. M. Williams, J. B. Johnson, T. Rovis\*. *J. Am. Chem. Soc.* **2008**, *130*, 14936-14937.
  - *Highlighted in: Synfacts* **2009**, 194.
54. "Ligand differentiated complementary Rh-catalyst systems for the enantioselective desymmetrization of meso-cyclic anhydrides." J. B. Johnson, M. J. Cook, T. Rovis\*. *Tetrahedron* **2009**, *65*, 3202-3210.
55. "Enantioselective Rhodium-Catalyzed Alkylative Desymmetrization of 3,5-dimethylglutaric Anhydride." M. J. Cook and T. Rovis\*. *Synthesis: Practical Synthetic Procedure*, **2009**, 335.
56. "2-Phenyl-6,10b-dihydro-4*H*,5*aH*-5-oxa-3,10c-diaza-2-azonia-cyclopenta[*c*]fluorine tetrafluoroborate; 2-Pentafluorophenyl-6,10b-dihydro-4*H*,5*aH*-5-oxa-3,10c-diaza-2-azoniacyclopenta[*c*]fluorene tetrafluoroborate; 6,7-Dihydro-2-phenyl-5-(phenylmethyl)-

- 5H-pyrrolo[2,1-c]-1,2,4-triazolium chloride.” S. P. Lathrop, H. U. Vora, T. Rovis\*. *Electronic Encyclopedia of Reagents for Organic Synthesis*, **2008**.
57. “Nucleophilic Carbene Catalyzed Synthesis of 1,2 Amino Alcohols Via Azidation of Epoxy Aldehydes.” H. U. Vora, J. R. Moncecchi, O. Epstein, T. Rovis\*. *J. Org. Chem.* **2008**, *73*, 9727-9731.
58. “Beyond Reppe: Building Substituted Benzenes via [2+2+2] Cycloadditions of Alkynes.” B. R. Galan, T. Rovis\*. *Angew. Chem. Int. Edit.* **2009**, *48*, 2830-2834.
59. “Total Synthesis of Indolizidine Alkaloid (–)-209D: Overriding Substrate Bias in the Asymmetric Rhodium-Catalyzed [2+2+2] Cycloaddition.” R. T. Yu, E. E. Lee, G. Malik, T. Rovis\*. *Angew. Chem. Int. Edit.* **2009**, *48*, 2379-2382.  
• *Highlighted in: Synfacts* **2009**, 632.
60. “Regioselective rhodium-catalyzed intermolecular [2+2+2] cycloaddition of alkynes and isocyanates to form pyridones.” K. M. Oberg, E. E. Lee, T. Rovis\*. *Tetrahedron* **2009**, *65*, 5056-5061.
61. “Enantio- and Diastereoselective Intermolecular Stetter Reaction of Glyoxamide and Alkylidene Ketoamides.” Q. Liu and T. Rovis\*. *Org. Lett.* **2009**, *11*, 2856-2859.
62. “Catalytic Asymmetric Intermolecular Stetter Reaction of Heterocyclic Aldehydes with Nitroalkenes: Backbone Fluorination Improves Selectivity.” D. A. DiRocco, D. M. Dalton, K. M. Oberg, T. Rovis\*. *J. Am. Chem. Soc.* **2009**, *131*, 10872-10874.
63. “Predictable and Regioselective Insertion of Internal Unsymmetrical Alkynes in Rhodium-Catalyzed Cycloadditions with Alkenyl Isocyanates” R. Keller Friedman and T. Rovis\*. *J. Am. Chem. Soc.* **2009**, *131*, 10775-10782.

### ***Invited Seminars***

*More than 100 invited seminars presented at universities, companies and conferences around the world.*

### ***Graduate Students and Postdoctoral Coworkers***

*Advised 30 Graduate Students and 13 Postdoctoral Fellows as coworkers with ~25 undergraduate coworkers over the past 9 years.*