

*Curriculum Vitae*  
**Timothy R. Ramadhar, Ph.D.**

**Address:** Department of Chemistry  
Howard University  
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**E-mail:** timothy.ramadhar@howard.edu  
**Citizenships:** United States of America, Canada

**Academic Employment**

1. **Institution:** Howard University Aug. 2018  
**Position:** Assistant Professor

**Education**

3. **Institution:** Harvard Medical School Jan. 2013 – June 2018  
**Position:** Postdoctoral Fellow (Chemical Biology)  
**Supervisor:** Prof. Jon Clardy  
**Award:** NIH F32 Ruth L. Kirschstein National Research Service Award
2. **Institution:** University of Toronto Sept. 2007 – Oct. 2012  
**Degree:** Doctor of Philosophy (Organic Chemistry)  
**Supervisor:** Prof. Robert A. Batey  
**Awards:** NSERC Canada Graduate Scholarships D3 and M
1. **Institution:** University of Waterloo Sept. 2003 – June 2007  
**Degree:** Bachelor of Science (Honours Biochemistry)  
**Honours:** Graduated on Dean's Honours List

**Research Experience**

5. **Position:** Postdoctoral Fellow, Chemical Biology, Harvard Medical School Jan. 2013 – June 2018  
**Supervisor:** Prof. Jon Clardy, Harvard Medical School (Biological Chemistry and Molecular Pharmacology)  
**Projects:** Discovery of potential therapeutic agents from insect-associated symbiotic bacteria, investigating the modulatory roles of small molecules in biological systems, and analyzing and improving the crystalline sponge method
4. **Positions:** Research Assistant, Organic Chemistry Oct. 2012 – Dec. 2012  
Ph.D. Candidate Sept. 2007 – Oct. 2012  
**Supervisor:** Prof. Robert A. Batey, University of Toronto (Chemistry)  
**Thesis:** Synthetic and Theoretical Studies of [3,3]-Sigmatropic Rearrangements and Development of Allylboration Reactions
3. **Positions:** Summer Research Assistant, Medicinal Chemistry May 2007 – Aug. 2007  
Honours Thesis Student Sept. 2006 – Apr. 2007  
Volunteer Sept. 2005 – Dec. 2005  
NSERC USRA Student May 2005 – Aug. 2005  
**Supervisor:** Prof. Gary I. Dmitrienko, University of Waterloo (Chemistry)  
**Project:** Design and synthesis of broad-spectrum inhibitors for class B and class D  $\beta$ -lactamases
2. **Position:** NSERC USRA Student, Physical Chemistry / NMR Spectroscopy May 2006 – Aug. 2006  
**Supervisor:** Prof. William P. Power, University of Waterloo (Chemistry)  
**Project:** Development of gel-phase nuclear magnetic resonance spectroscopic experiments for analyzing peptides on solid support synthetic resins
1. **Positions:** NSERC USRA Student, Biochemistry May 2004 – Aug. 2004  
CHEM 13 News Research Assistant Sept. 2003 – Apr. 2004  
**Supervisor:** Prof. Michael Palmer, University of Waterloo (Chemistry)  
**Project:** Elucidation and characterization of the proteomic domains in *S. agalactiae* CAMP factor

**Teaching Experience**

4. *Course:* CHEM 255 – Practical Crystallography in Chemistry and Materials Science (Grad Course)  
*Position:* Teaching Fellow  
*Location:* Harvard University – Winter 2014  
*Duties:* Ran X-ray diffraction lab portion of the course. Monitored course blog, marked assignments, projects, and final exams.  
*Note:* Q Evaluations – Section Leader / TF Overall Mean Score: 4.8 / 5
3. *Course:* CHM 101 – Chemistry and Biology of Organic Molecules  
*Position:* Teaching Assistant – Tutorial Demonstrator  
*Location:* University of Toronto – Winter 2011, Winter 2012  
*Duties:* Designed and ran tutorial classes for students. Taught two lectures. Invigilated the course midterm and evaluated student posters. Marked midterms, student essays, and final exams.
2. *Course:* CHM 343 – Organic Synthesis Techniques  
*Position:* Teaching Assistant – NMR Demonstrator  
*Location:* University of Toronto – Winter 2008  
*Duties:* Acquired and processed NMR spectra for students.
1. *Course:* CHM 247 – Introductory Organic Chemistry II  
*Position:* Teaching Assistant – Laboratory Demonstrator  
*Location:* University of Toronto – Fall 2007  
*Duties:* Computational teaching assistant in charge of running the computational laboratory experiment. Marked midterm examinations.

**Awards and Scholarships**

19. National Institutes of Health (NIH) Ruth L. Kirschstein National Research Service Award F32 Postdoctoral Fellowship Grant (grant numbers: 1F32GM108415-01A1 | 5F32GM108415-02) (May 2014 – April 2016)
18. Doctoral Completion Award, University of Toronto (Sept. 2012)
17. Teaching Reduction – University of Toronto Fellowship (Sept. 2011 – Aug. 2012)
16. Natural Sciences and Engineering Research Council (NSERC) of Canada Alexander Graham Bell Canada Graduate Scholarship (CGS) D3 (Sept. 2008 – Aug. 2011)
15. Mary H. Beatty Fellowship, University of Toronto (Sept. 2007 – Aug. 2008)
14. Helen Sawyer Hogg Graduate Admission Award, University of Toronto (Sept. 2007 – Aug. 2008)
13. NSERC Canada Graduate Scholarship (CGS) M Scholarship (Sept. 2007 – Aug. 2008)
12. Ontario Graduate Scholarship, Ontario Ministry of Training, Colleges, and Universities (award declined both Sept. 2007 – Aug. 2008 and Sept. 2008 – Aug. 2009)
11. SCI Merit Award, The Society of Chemical Industry (Sept. 2007 – Aug. 2008)
10. ACS DOC NOS Travel Award for Outstanding Undergraduate Students (June 2007)
9. SOUSCC Biochemistry / Bioorganic Division Oral Presentation Competition – 2<sup>nd</sup> Place (March 2007)
8. Biochemistry Upper – Year Scholarship, University of Waterloo (awarded twice: Sept. 2006 – April 2007; Sept. 2004 – Apr. 2005)
7. NSERC Undergraduate Student Research Award (USRA) (awarded three times: May 2006 – Aug. 2006; May 2005 – Aug. 2005; May 2004 – Aug. 2004)
6. Bruce Wyler Kelly Memorial Prize, University of Waterloo (Sept. 2005 – Apr. 2006)
5. Gretchen E. Mueller Memorial Biochemistry Scholarship, UWaterloo (Sept. 2005 – Apr. 2006)
4. Don E. Irish Scholarship in Science, University of Waterloo (Sept. 2004 – Apr. 2005)
3. Queen Elizabeth II Aiming for the Top Scholarship, Ontario Ministry of Training, Colleges, and Universities (Sept. 2003 – Apr. 2007)
2. Dean's Honours List, University of Waterloo (awarded for all eight terms)
1. CHEM 13 News Research Assistantship, University of Waterloo (Sept. 2003 – Apr. 2004)

**Publications**

21. Puri, A. W.;‡ Mevers, E.;‡ **Ramadhar, T. R.**;‡ Petras, D.; Liu, D.; Piel, J.; Dorrestein, P. C.; Greenberg, E. P.; Lidstrom, M. E.; Clardy, J.\* “Tundrenone: An Atypical Secondary Metabolite from Bacteria with Highly Restricted Primary Metabolism”. *Journal of the American Chemical Society* **2018**, *140*, 2002–2006. (‡ - Equal first authorship)
20. **Ramadhar, T. R.**; Kawakami, J.; Batey, R. A.\* “Sequential O-Arylation / Lanthanide(III)-Catalyzed [3,3]-Sigmatropic Rearrangement of Bromo-Substituted Allylic Alcohols”. *Synlett* **2017**, *28*, 2865–2870.
19. **Ramadhar, T. R.**.\* Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* “The Crystalline Sponge Method: A Solvent-Based Strategy to Facilitate Noncovalent Ordered Trapping of Solid and Liquid Organic Compounds”. *CrystEngComm* **2017**, *19*, 4528–4534. (Co-corresponding first author)
18. Beemelmans, C.;‡ **Ramadhar, T. R.**;‡ Kim, K. H.;‡ Klassen, J. L.; Cao, S.; Wyche, T. P.; Hou, Y.; Poulsen, M.; Bugni, T. S.; Currie, C. R.; Clardy, J.\* “Macrotermycins A–D, Glycosylated Macrolactams from a Termite-Associated *Amycolatopsis* sp. M39”. *Organic Letters* **2017**, *19*, 1000–1003. (‡ - Equal first authorship)
17. Mevers, E.; Saurí, J.; Liu, Y.; Moser, A.; **Ramadhar, T. R.**; Varlan, M.; Williamson, R. T.; Martin, G. E.; Clardy, J.\* “Homodimericin A: A Complex Hexacyclic Fungal Metabolite”. *Journal of the American Chemical Society*, **2016**, *138*, 12324–12327.
16. Sit, C. S.;‡ Ruzzini, A. C.;‡ Van Arnem, E. B.; **Ramadhar, T. R.**; Currie, C. R.; Clardy, J.\* “Variable genetic architectures produce virtually identical molecules in bacterial symbionts of fungus-growing ants”. *Proceedings of the National Academy of Sciences USA*, **2015**, *112*, 13150–13154. (Open access)
15. Hiraki, M.;‡ Hwang, S.-Y.;‡ Cao, S.;‡ **Ramadhar, T. R.**; Byun, S.; Yoon, K. W.; Lee, J. H.; Chu, K.; Gurkar, A. U.; Kolev, V.; Zhang, J.; Namba, T.; Murphy, M. E.; Newman, D. J.; Mandinova, A.; Clardy, J.\*; Lee, S. W.\* “Small Molecule Reactivation of Mutant p53 through wt-like p53-Hsp40 Regulatory Axis”. *Chemistry and Biology* **2015**, *22*, 1206–1216. (Open access)
14. Byun, S.; Lim, S.; Mun, J. Y.; Kim, K. H.; **Ramadhar, T. R.**; Farrand, L.; Shin, S. H.; Thimmegowda, N. R.; Lee, H. J.; Frank, D. A.; Clardy, J.\*; Lee, S. W.\*; Lee, K. W.\* “Identification of a Dual Inhibitor of Janus Kinase 2 (JAK2) and p70 Ribosomal S6 Kinase1 (S6K1) Pathways.” *Journal of Biological Chemistry*, **2015**, *290*, 23553–23562. (Open access)
13. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* “The Crystalline Sponge Method: MOF Terminal Ligand Effects”. *Chemical Communications* **2015**, *41*, 11252–11255. (Open access)  
**\*\*See Media Coverage Section\*\***
12. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* “Analysis of Rapidly-Synthesized Guest-Filled Porous Complexes with Synchrotron Radiation: Practical Guidelines for the Crystalline Sponge Method”. *Acta Crystallographica Section A: Foundations and Advances* **2015**, *71*, 46–58. (Open access)  
**\*\*See Media Coverage Section\*\***
11. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* “The Crystalline Sponge Method: Synthetic and Crystallographic Guidelines”. *Acta Crystallographica Section A: Foundations and Advances* **2014**, *70*, C1784. (Published conference abstract for IUCr2014 in Montréal, Québec, Canada, Aug. 5–12, 2014)
10. Kim, K. H.;‡ **Ramadhar, T. R.**;‡ Beemelmans, C.;‡ Cao, S.; Poulsen, M.; Currie, C. R.; Clardy, J.\* “Natalamycin A, an Ansamycin from Termite-Associated *Streptomyces* sp.”. *Chemical Science* **2014**, *5*, 4333–4338. (‡ - Equal first authorship)
9. **Ramadhar, T. R.**; Beemelmans, C.; Currie, C. R.; Clardy, J.\* “Bacterial Symbionts in Agricultural Systems Provide a Strategic Source for Antibiotic Discovery”. *Journal of Antibiotics* **2014**, *67*, 53–58. (Review article)
8. **Ramadhar, T. R.**; Bansagi, J.; Batey, R. A.\* “Mild Double Allylboration Reactions of Nitriles and Anhydrides Using Potassium Allyltrifluoroborate”. *Journal of Organic Chemistry* **2013**, *78*, 1216–1221.
7. **Ramadhar, T. R.**.\* Batey, R. A.\* “Accurate Prediction of Experimental Free Energy of Activation Barriers for the Aliphatic-Claisen Rearrangement through DFT Calculations”. *Computational and Theoretical Chemistry* **2011**, *976*, 167–182. (Co-corresponding first author)
6. **Ramadhar, T. R.**; Batey, R. A.\* “Resolving the Mechanistic Origins of *E/Z*-Selectivity Differences for the Aryl-Claisen Rearrangement through DFT Calculations”. *Computational and Theoretical Chemistry* **2011**, *974*, 76–78.

5. **Ramadhar, T. R.**; Batey, R. A.\* "Recent Advances in Nucleophilic Addition Reactions of Organoboronic Acids and their Derivatives to Unsaturated C–N Functionalities". *Boronic Acids: Preparation and Applications in Organic Synthesis, Medicine and Materials*, Second Edition. Hall, D. G. Ed.; Wiley-VCH: Weinheim, Germany, **2011**, Chapter 9, 427–477.
4. **Ramadhar, T. R.**; Batey, R. A.\* "Allylation of Imines and their Derivatives with Organoboron Reagents: Stereocontrolled Synthesis of Homoallylic Amines". *Synthesis* **2010**, 1321–1346. (Review article)
3. **Ramadhar, T. R.**; Kawakami, J.; Lough, A. J.; Batey, R. A.\* "Stereocontrolled Synthesis of Contiguous C(sp<sup>3</sup>)-C(aryl) Bonds by Lanthanide(III)-Catalyzed Domino Aryl-Claisen [3,3]-Sigmatropic Rearrangements". *Organic Letters* **2010**, 12, 4446–4449.
2. Johnson, J. W.; Evanoff, D. P.; Savard, M. E.; Lange, G.; **Ramadhar, T. R.**; Assoud, A.; Taylor, N. J.; Dmitrienko, G. I.\* "Cyclobutanone Mimics of Penicillins: Effects of Substitution on Conformation and Hemiketal Stability". *Journal of Organic Chemistry* **2008**, 73, 6970–6982.
1. **Ramadhar, T. R.**; Amador, F.; Ditty, M. J. T.; Power, W. P.\* "Inverse H-C *ex situ* HRMAS NMR Experiments for Solid-Phase Peptide Synthesis". *Magnetic Resonance in Chemistry* **2008**, 46, 30–35.

### Patent Applications

2. Dmitrienko, G. I.\*; Johnson, J. W.; **Ramadhar, T. R.**; Viswanatha, T.; Viswanatha, S. "Beta-Lactamase Inhibitors". US Patent Application 20110046101 A1. Published February 24, 2011.
1. Dmitrienko, G. I.\*; Viswanatha, T.; Johnson, J. W.; **Ramadhar, T. R.** "Inhibitors of Class B and Class D  $\beta$ -Lactamases". WIPO/PCT Application WO 2009/114921 A1. Published September 24, 2009.

### Invited Lecture

**Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* "Introduction to Chemical Crystallography and the Crystalline Sponge Method". Center for the Science of Therapeutics (CSofT) / Center for the Development of Therapeutics (CDoT) New Technologies Club, Broad Institute of MIT and Harvard, Cambridge, MA, USA, March 4, 2016. *Inaugural Speaker*

### Conference Oral Presentations

7. **Ramadhar, T. R.**; Kim, K. H.; Beemelmans, C.; Cao, S.; Klassen, J.; Wyche, T. P.; Hou, Y.; Poulsen, M.; Bugni, T.; Currie, C. R.; Clardy, J.\* "Discovery and Detailed Structural Studies of Natural Products from Termite-Associated Actinobacteria". 99<sup>th</sup> Canadian Chemistry Conference and Exhibition 2016, Halifax, Nova Scotia, Canada. June 5–9.
6. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* "Practical Guidelines and Insights for the Crystalline Sponge Method". 2015 American Crystallographic Association Meeting, Philadelphia, PA, USA, July 25–29.
5. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* "The Crystalline Sponge Method: Procedural Improvements and Perspectives". 98<sup>th</sup> Canadian Chemistry Conference and Exhibition 2015, Ottawa, Ontario, Canada. June 13–17.
4. **Ramadhar, T. R.**; Batey, R. A.\* "A DFT Study of Reactivity and Selectivity of Aryl-Claisen Rearrangements: Analysis of Various Functionals for the Claisen Rearrangement". 93<sup>rd</sup> Canadian Chemistry Conference and Exhibition 2010, Toronto, Ontario, Canada. May 29 – June 2.
3. **Ramadhar, T. R.**; Kawakami, J.; Lough, A. J.; Batey, R. A.\* "Development and Studies of Catalyzed Mono and Domino Aryl-Claisen Rearrangements". 92<sup>nd</sup> Canadian Chemistry Conference 2009, Hamilton, Ontario, Canada. May 30 – June 3.
2. **Ramadhar, T. R.**; Johnson, J. W.; Marrone, L.; Evanoff, D. P.; Goodfellow, V. J.; Spencer, J.; Walsh, T. R.; Viswanatha, T.; Dmitrienko, G. I.\* "Design and Synthesis of Broad-Spectrum Inhibitors for Class B and Class D  $\beta$ -lactamases". 35<sup>th</sup> Southern Ontario Undergraduate Student Chemistry Conference 2007, University of Ontario Institute of Technology, Oshawa, Ontario, Canada. March 17.
1. **Ramadhar, T. R.**; Amador, F.; Ditty, M. J. T.; Power, W. P.\* "BIRD-HMQC and CT-HMBC-1: Promising Gel-phase Inverse NMR Experiments for Determining the <sup>1</sup>H-<sup>13</sup>C Connectivities of Peptides on Wang Resin". 2006 MOOT XIX NMR Symposium, University of Guelph, Guelph, Ontario, Canada. Sept. 23–24.

**Conference Poster Presentations**

7. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* "The Crystalline Sponge Method: Synthetic and Crystallographic Guidelines". 23<sup>rd</sup> Congress and General Assembly of the International Union of Crystallography (IUCr2014), Montréal, Québec, Canada, August 5 – 12. (Published conference abstract: *Acta Crystallographica Section A: Foundations and Advances* **2014**, *70*, C1784).
6. **Ramadhar, T. R.**;‡ Kim, K. H.;‡ Beemelmans, C.;‡ Cao, S.; Poulsen, M.; Currie, C. R.; Clardy, J.\* "Natalamycin A, an Ansamycin from Termite-Associated *Streptomyces* sp.". 2014 Gordon Research Conference: Natural Products, Andover, NH, USA, July 20–25. (‡ - Equal first authorship)
5. **Ramadhar, T. R.**; Zheng, S.-L.; Beemelmans, C.; Clardy, J.\* "Adaptation and Application of Nonstandard Techniques in Small Molecule Structural Elucidation". 2013 Harvard Medical School Biological Chemistry and Molecular Pharmacology Departmental Retreat, North Conway, NH, USA, October 22–24.
4. **Ramadhar, T. R.**; Batey, R. A.\* "Synthetic and Theoretical Investigations on Aryl- and Aliphatic-Claisen Rearrangements". 2011 American Chemical Society Division of Organic Chemistry Graduate Research Symposium, University of California Santa Barbara, Santa Barbara, CA, USA, July 14–17.
3. **Ramadhar, T. R.**; Kawakami, J.; Lough, A. J.; Batey, R. A.\* "Lanthanide(III)-Catalyzed Single and Domino Aryl-Claisen Rearrangements for the Synthesis of Contiguous Aryl Moieties and the Preliminary Design of Heterocycles". 41<sup>st</sup> National Organic Symposium 2009, Univ. Colorado, Boulder, CO, USA. June 7–11.
2. **Ramadhar, T. R.**; Kawakami, J.; Lough, A. J.; Batey, R. A.\* "Development, Investigation and Potential Applications of Lanthanide-Catalyzed Domino Aryl-Claisen Rearrangements". 2008 Quebec-Ontario Minisymposium in Synthetic and Bioorganic Chemistry, Univ. Toronto, Toronto, ON, Canada. Nov. 7–9.
1. **Ramadhar, T. R.**; Johnson, J. W.; Marrone, L.; Evanoff, D. P.; Goodfellow, V. J.; Spencer, J.; Walsh, T. R.; Viswanatha, T.; Dmitrienko, G. I.\* "Development of Metallo- $\beta$ -Lactamase and Oxacillinase Broad-Spectrum Competitive Inhibitors". 40<sup>th</sup> ACS DOC National Organic Symposium 2007, Duke University, Durham, NC, USA. June 3–7.

**Media Coverage**

4. Expert opinion given on a *Journal of the American Chemical Society* article by Prof. Makoto Fujita's group (**2016**, *138*, 10140–10142) and quoted in an *RSC Chemistry World* story "Explosive intermediates muzzled by crystalline sponge" (August 24, 2016; <https://www.chemistryworld.com/news/explosive-intermediates-muzzled-by-crystalline-sponge/1017308.article>)
3. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* *Chem. Commun.* **2015**, *51*, 11252–11255: Interviewed for and quoted in an *RSC Chemistry World Magazine Article* "Confronting the Crystalline Sponge" (June 24, 2015; <http://www.rsc.org/chemistryworld/2015/06/confronting-crystalline-sponge>) where this manuscript was solely featured.
2. Expert opinion given on a *Chemical Science* article by Prof. Makoto Fujita's group (**2015**, *6*, 3765–3768) and quoted in an *RSC Chemistry World* story "Crystalline sponge method strikes again" (May 26, 2015; <http://www.rsc.org/chemistryworld/2015/05/crystal-free-x-ray-crystallography-axial-planar-chirality>)
1. **Ramadhar, T. R.**; Zheng, S.-L.; Chen, Y.-S.; Clardy, J.\* *Acta Cryst.* **2015**, *A71*, 46–58:
  - b. Interviewed for and quoted in an *ACS Chemical and Engineering News* article "Crystalline Sponges Catching On With Chemists" (February 16, 2016; Vol. 93, Iss. 7, pgs. 29–30, <http://cen.acs.org/articles/93/i7/Crystalline-Sponges-Catching-Chemists.html>).
  - a. Featured in Dr. Derek Lowe's blog *In the Pipeline* "Guidelines for MOF Crystallography" (December 12, 2014; [http://blogs.sciencemag.org/pipeline/archives/2014/12/12/guidelines\\_for\\_mof\\_crystallography](http://blogs.sciencemag.org/pipeline/archives/2014/12/12/guidelines_for_mof_crystallography)) and mentioned again in "X-ray Sponges Ride Again" (June 15, 2015; [http://blogs.sciencemag.org/pipeline/archives/2015/06/15/xray\\_sponges\\_ride\\_again](http://blogs.sciencemag.org/pipeline/archives/2015/06/15/xray_sponges_ride_again))

**Professional Memberships**

2. Member of the Chemical Institute of Canada (MCIC) (Organic Chemistry Division)
1. Member of the American Chemical Society (Divisions of Biological, Organic, and Medicinal Chemistry)