

# Miles W. Johnson

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Department of Chemistry  
University of Richmond  
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## PROFESSIONAL EXPERIENCE

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**University of Richmond, Richmond, VA** 2016 – present

Assistant Professor of Chemistry

**California Institute of Technology, Pasadena, CA** 2014 – 2016

National Institute of Health Post-Doctoral Fellow

Advisor: Prof. Jonas C. Peters in collaboration with Prof. Gregory C. Fu

*Mechanistic Investigation of a Photoinduced, Copper-Catalyzed Cross-Coupling Reaction*

## EDUCATION

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**University of California, Berkeley, CA** 2014

Ph.D. in Chemistry

NSF Pre-Doctoral Fellow and Chancellor's Fellow

Advisors: Profs. Robert G. Bergman and F. Dean Toste

*Studies in Gold-Heteroatom Bonds: Synthesis, Reactivity, and Application to Catalysis*

**University of Richmond, Richmond, VA** 2009

B.S. in Chemistry and Spanish, *summa cum laude* with honors in Chemistry

Advisor: Prof. C. Wade Downey

*An in situ One-Pot Enol Silane Formation-Mukaiyama Aldol-Type Reaction Mediated by TMSOTf*

**Universidad Católica Argentina, Buenos Aires, Argentina** Spring 2008

Study abroad language immersion program

## AWARDS AND HONORS

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### Caltech

Ruth L. Kirschstein NRSA (F32) Post-Doctoral Fellowship 2015

### UC Berkeley

Chancellor's Fellowship 2011

National Science Foundation Graduate Research Fellowship 2009

## University of Richmond

|  |            |
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| Phi Beta Kappa                         | 2009       |
| Garnett Ryland Award                   | 2009       |
| Barry M. Goldwater Scholarship         | 2008       |
| J. Stanton Pierce Award                | 2008       |
| Second-Year Research Achievement Award | 2007       |
| HHMI Undergraduate Research Fellowship | 2006, 2007 |

## PUBLICATIONS (*Undergraduates are underlined, \*denotes corresponding author*)

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### University of Richmond

- 12.** Fokwa, H. D.; Vidlak, J. F.; Weinberg, S. C.; Duplessis, I. D.; Schley, N. D.; **Johnson, M. W.\*** "Modular Synthesis of Bidentate Bis(Phosphino) Pyrrole Ligands" *Manuscript in Preparation*
- 11.** Matthews, A. M.;<sup>‡</sup> Prasad, S.;<sup>‡</sup> Schley, N. S.; Donald, K. J.;\* **Johnson, M. W.\*** "On Transannulation in Azaphosphatranes: Synthesis and Theoretical Analysis" *Manuscript in Revision (Inorg. Chem.)*; <sup>‡</sup> denotes equal contribution.
- 10.** Matthews, A. M.; Gravalis, G. M.; Schley, N. S.; **Johnson, M. W.\*** "Synthesis, Structure, and Reactivity of Palladium Proazaphosphatrane Complexes Invoked in C–N Cross-Coupling" *Organometallics*, **2018**, *37*, 3073-3078.

### Caltech

- 9.** **Johnson, M. W.**; Hannoun, K. I.; Tan, Y.; Fu, G. C.; Peters, J. C. "A Mechanistic Investigation of the Photoinduced, Copper-Mediated Cross-Coupling of an Aryl Thiol with an Aryl Halide" *Chem. Sci.*, **2016**, *7*, 4091-4100.

### UC Berkeley

- 8.** Khrakovsky, D.; Tao, C.; **Johnson, M. W.**; Thornbury, R.; Shevick, S. L.; Toste, F. D. "Enantioselective, Stereodivergent Hydroazidation and Hydroamination of Allenes Catalyzed by Acyclic Diaminocarbene (ADC) Gold(I) Complexes" *Angew. Chem. Int. Ed.*, **2016**, *55*, 1-6.
- 7.** **Johnson, M. W.**; DiPasquale, A. G.; Bergman, R. G.; Toste, F. D. "Synthesis of Stable Gold(III) Pincer Complexes with Anionic Heteroatom Donors" *Organometallics*, **2014**, *33*, 4169-4172.
- 6.** **Johnson, M. W.**; Bagley, S. W. Mankad, N. P.; Bergman, R. G.; Mascitti, V.; Toste, F. D. "Application of Fundamental Organometallic Chemistry to the Development of a Gold-Catalyzed Synthesis of Sulfinat Derivatives" *Angew. Chem. Int. Ed.* **2014**, *53*, 4404-4407.
- 5.** **Johnson, M. W.**; Shevick, S. L.; Toste, F. D.; Bergman, R. G. "Preparation and Reactivity of Terminal Gold(I) Amides and Phosphides" *Chem. Sci.*, **2013**, *4*, 1023-1027.

4. Brown, C. J.; Miller, G. M.; **Johnson, M. W.**; Bergman, R. G.; Raymond, K. N. "High-Turnover Supramolecular Catalysis by a Protected Ruthenium(II) Complex in Aqueous Solution" *J. Am. Chem. Soc.* **2011**, *133*, 11964-11966.

### University of Richmond

3. Downey, C. W.; **Johnson, M. W.**; Lawrence, D. H.; Fleisher, A. S.; Tracy, K. J. "Acetic Acid Aldol Reactions in the Presence of Trimethylsilyl Trifluoromethanesulfonate" *J. Org. Chem.* **2010**, *75*, 5351-5354.
2. Downey, C. W.; **Johnson, M. W.**; Tracy, K. J. "One-Pot Enol Silane Formation-Mukaiyama Aldol-Type Addition to Dimethyl Acetals Mediated by TMSOTf" *J. Org. Chem.* **2008**, *73*, 3299-3302.
1. Downey, C. W.; **Johnson, M. W.**; "A Tandem Enol Silane Formation-Mukaiyama Aldol Reaction Mediated by TMSOTf" *Tetrahedron Lett.* **2007**, *48*, 3559-3562.

### TEACHING EXPERIENCE

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#### University of Richmond (*Instructor*)

|           |                              |
|-----------|------------------------------|
| CHEM 205  | Organic Chemistry I Lecture  |
| CHEM 205L | Organic Chemistry I Lab      |
| CHEM 206  | Organic Chemistry II Lecture |
| CHEM 317  | Inorganic Chemistry          |
| CHEM 317L | Inorganic Chemistry Lab      |
| CHEM 417  | Organometallic Chemistry     |

#### University of California at Berkeley (*Graduate Student Instructor*)

|           |                                   |
|-----------|-----------------------------------|
| CHEM 3BL  | Chemical Structure and Reactivity |
| CHEM 112B | Organic Chemistry                 |

### GRANTS

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#### External (total = \$155,000)

|   |             |
|---|-------------|
| American Chemical Society Petroleum Research Fund (UNI)<br><i>Modular and Rational Design of Pyrrolyl Phosphine Ligands for Nickel Catalysis (\$55,000)</i>   | 2019 – 2021 |
| Thomas F. and Kate Milles Jeffress Memorial Trust Award<br><i>An Integrated Synthetic-Computational Approach to Developing a Quantitative Model for Proazaphosphatrane-Enabled Cross-Coupling (\$100,000)</i> | 2018 – 2019 |

#### Internal Faculty Grants

|                                    |      |
|------------------------------------|------|
| Faculty Summer Research Fellowship | 2018 |
|------------------------------------|------|

A&S Dean's Summer Fellowship 2017

### **Internal Student Grants**

Puryear-Topham Summer Fellowships 2018

Arts and Sciences Summer Fellowship (Carpenter Gift) 2018

Puryear-Topham Summer Fellowships 2017

Integrated Quantitative Sciences Summer Research Fellowship 2017

## **ORAL PRESENTATIONS**

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### **University of Richmond**

*Synthetic and Mechanistic Studies of Aminophosphine Ligands for Transition Metal-Catalyzed Cross-Coupling.* High Point University, High Point, NC, September 13, 2019. *Invited*

*Synthetic and Mechanistic Studies of Aminophosphine Ligands for Transition Metal-Catalyzed Cross-Coupling.* University of North Carolina, Greensboro, NC, April 12, 2019. *Invited*

*Synthesis and Reactivity of Transition Metal and Main Group Proazaphosphatrane Complexes.* ACS National Meeting, Orlando, FL, April 1, 2019. *Invited for "Undergraduate Research at the Frontiers of Inorganic Chemistry"*

*Synthesis, Structure and Reactivity of Palladium Proazaphosphatrane Complexes: Insight into a Conformationally Flexible Ligand.* Southeastern Regional Meeting of the American Chemical Society, Augusta, GA, November 1, 2018.

*Synthesis and Reactivity of Proazaphosphatrane-Supported Palladium Complexes: Elusive Intermediates in Cross-Coupling.* ACS National Meeting, Boston, MA, August 20, 2018.

### **Caltech**

*Mechanistic Investigations of Carbon-Sulfur Bond-Formation Using Gold and Copper.* Swarthmore College, Swarthmore, PA, November 19, 2015. *Invited*

*Mechanistic Investigations of Carbon-Sulfur Bond-Formation Using Gold and Copper.* Barnard College, New York, NY, November 17, 2015. *Invited*

*Mechanistic Investigations of Carbon-Sulfur Bond-Formation Using Gold and Copper.* University of Richmond, Richmond, VA, November 10, 2015. *Invited*

*Mechanistic Investigations of Carbon-Sulfur Bond-Formation Using Gold and Copper.* San Jose State University, San Jose, CA, November 5, 2015. *Invited*

### **UC Berkeley**

*Exploiting Gold-Heteroatom Bonds: Synthesis, Reactivity and Applications to Catalysis.* University of Richmond Class of 2009 Symposium, University of Richmond, VA, June 2013. *Invited*

*Synthesis and Reactivity of Terminal Gold(I) Phosphides and Amides.* Gordon Research Conference for Organometallic Chemistry, Newport, RI, July 2012. *Invited*

## University of Richmond

Downey, C. W. *Silylation-Induced Aldol Reactions of Acetophenone*. Howard Hughes Medical Institute Research Symposium, University of Richmond, VA, September 2006.

## POSTER PRESENTATIONS (*Undergraduate researchers are underlined, \*denotes presenter*)

### University of Richmond

Matthews, A. D.; Fokwa, H. D.; Weinberg, S. C.; Vidlak, J. F.; Duplessis, I. D.; Sriramaneni, N. K.; Prasad, S.; Donald, K. J.; Schley, N. S.; Johnson, M. W.\* *Design and Synthesis of Modular Aminophosphine Ligands for Cross-Coupling*. Gordon Research Conference for Organometallic Chemistry, Newport, RI, July 2019.

Shen, S.\* Johnson, M. W. *Synthesis of Boronate Ester Derivatives of Triphenylphosphine*. A&S Symposium, University of Richmond, Richmond, VA, April 12, 2019.

Duplessis, I. D.\* Shen, S.; Schley, N. D.; Johnson, M. W. *Study of Proazaphosphatrane Ligands and Their Analogues in Cross-Coupling*. A&S Symposium, University of Richmond, Richmond, VA, April 12, 2019.

Fokwa, H. D.\* Weinberg, S. C.\* Johnson, M. W. *Synthesis of N-Phosphino-2-(Phosphino)Pyrrole Ligands for Catalysis*. A&S Symposium, University of Richmond, Richmond, VA, April 12, 2019.

Fokwa, H. D.\* Weinberg, S. C.; Johnson, M. W. *Synthesis of N-Phosphino-2-(Phosphino)Pyrrole Ligands for Catalysis*. ACS National Meeting, Orlando, FL, April 3, 2019.

Duplessis, I. D.\* Shen, S.; Schley, N. D.; Johnson, M. W. *Study of Proazaphosphatrane Ligands and Their Analogues in Cross-Coupling*. Southeastern Regional Meeting of the American Chemical Society, Augusta, GA, November 2018.

Matthews, A. D.\* Schley, N. D.; Johnson, M. W. *Synthesis and Reactivity of Palladium Proazaphosphatrane Complexes Invoked in Cross-Coupling*. Southeastern Regional Meeting of the American Chemical Society, Augusta, GA, November 2018.

Matthews, A. D.; Duplessis, I. D.; Kotera, K.; Gravalis, G. M.; Schley, N. D. Johnson, M. W.\* *Synthesis and Reactivity of Transition Metal Proazaphosphatrane Complexes*. Gordon Research Conference for Organometallic Chemistry, Newport, RI, July 2018.

Duplessis, I. D.\* Matthews, A. D.\* Gravalis, G. M.\* Johnson, M. W. *Synthesis and Reactivity of Palladium Proazaphosphatrane Complexes Invoked in Cross-Coupling Reactions*. A&S Symposium, University of Richmond, Richmond, VA, April 20, 2018.

Kotera, K.\* Johnson, M. W. *Synthesis and Reactivity of Copper and Nickel Proazaphosphatrane Complexes*. A&S Symposium, University of Richmond, Richmond, VA, April 20, 2018.

Fokwa, H. D.\* Johnson, M. W. *Toward the Synthesis of Aminopyrrole Ligands and Their Complexes*. A&S Symposium, University of Richmond, Richmond, VA, April 20, 2018.

Johnson, M. W.;\* Duplessis, I. D.; Gravalis, G. M.; Kotera, K. *Synthesis and Reactivity of Low-Coordinate, Proazaphosphatrane-Supported Transition Metal Complexes*. Southeastern Regional Meeting of the American Chemical Society, Charlotte, NC, November 10, 2017.

Fokwa, H. D.;\* Matthews, A. D.;\* Johnson, M. W. *Synthesis of Pyrrole-Based Ligands for Main Group and Transition Metals*. Fall Science Symposium, University of Richmond, Richmond, VA, September 22, 2017.

Duplessis, I. D.;\* Gravalis, G. M.;\* Kotera, K.;\* Johnson, M. W. *Synthesis of Late Transition Metal Azaphosphatrane Complexes for Catalytic Applications*. Fall Science Symposium, University of Richmond, Richmond, VA, September 22, 2017.

### **UC Berkeley**

Johnson, M. W.;\* Shevick, S. L.; Bergman, R. G.; Toste, F. D. *Synthesis and Reactivity of Terminal Gold(I) Phosphides and Amides*. Gordon Research Conference for Organometallic Chemistry, Newport, RI, July 2012.

Johnson, M. W.;\* Bergman, R. G.; Toste, F. D. *Exploration of C-H Activation Using Rhenium-Oxo and -Imido Complexes*. Center for Catalytic Hydrocarbon Functionalization, Charlottesville, VA, May 2010.

### **University of Richmond**

Johnson, M. W.;\* Downey, C. W. *One-Pot Enol Silane Formation-Mukaiyama Aldol and Mukaiyama Aldol-Type Reactions Mediated by TMSOTf*. Southeastern Regional Meeting of the American Chemical Society, Nashville, TN, November 2008.

Johnson, M. W.;\* Downey, C. W. *A Tandem Enol Silane Formation-Mukaiyama Aldol Reaction Mediated by TMSOTf*. Howard Hughes Medical Institute Research Symposium, University of Richmond, VA, September 2007.

## **OUTREACH**

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### **University of Richmond**

*Pre-First Year Research Experience, Mentor* 2019

Mentored five incoming first-year students from groups underrepresented in STEM through an authentic research experience based on my lab's work.

*Structure Elucidation Workshop* 2017 – present

Instructed high schools students concerning the principles of spectroscopy during an annual outreach program.

### **California Institute of Technology**

*Solar Energy Activity Laboratory (SEAL), Research Mentor* 2014 – 2015

Guided a group of five high school students in developing a yearlong project to evaluate water-splitting catalysts. Aided the group in preparing a presentation for the annual Solar Energy Activity Lab Conference at Caltech.

### **University of California at Berkeley**

*Bay Area Scientists in Schools, Teacher* 2011 – 2014

Gave monthly interactive lessons on the science of soap and the scientific method to fifth graders in the Bay Area. Led lessons and also worked in a team of volunteers in overseeing experiments.

## RESEARCH STUDENTS (<sup>†</sup>*Collaboratively mentored students*)

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### University of Richmond (current)

|                      |      |  |
|----------------------|------|--|
| Isaiah D. Duplessis  | 2020 | Synthesis of Aminosphosphine Ligands                                       |
| Hilary D. Fokwa      | 2020 | Synthesis of Bis(phosphino)pyrrole Ligands                                 |
| Adrian D. Matthews   | 2020 | Study of Proazaphosphatrane complexes<br><i>Goldwater Recipient (2019)</i> |
| Sarah Shen           | 2020 | Synthesis of Boronate Ester Phosphine Ligands                              |
| Sophie C. Weinberg   | 2021 | Synthesis of Bis(phosphino)pyrrole Ligands                                 |
| Nihal K. Sriramaneni | 2021 | Synthesis of Bis(phosphino)pyrrole Ligands                                 |
| Jared I. Thomas      | 2021 | Synthesis of Proazaphosphatrane Complexes                                  |
| Julia F. Vidlak      | 2022 | Synthesis of Bis(phosphino)pyrrole Ligands                                 |

### University of Richmond (alumni)

|                              |      |   |
|------------------------------|------|---|
| Kiiko Kotera                 | 2019 | Synthesis of Proazaphosphatrane Complexes     |
| Supreeth Prasad <sup>†</sup> | 2019 | Computational Analysis of Transannulation     |
| Gregory M. Gravalis          | 2018 | Synthesis of Proazaphosphatrane Complexes     |
| Tess S. Muñoz <sup>†</sup>   | 2018 | Synthesis of Ligands for Explosives Detection |
| Arjun Jaini <sup>†</sup>     | 2018 | Synthesis of Ligands for Explosives Detection |

### Caltech and UC Berkeley

|                   |      |   |
|-------------------|------|---|
| Saaket Agrawal    | 2017 | N <sub>2</sub> Reduction  |
| Sophia L. Shevick | 2013 | Development of Gold Catalysts<br><i>Ph. D. Candidate (Scripps Research Institute)</i> |

## SERVICE

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### University

|  |                |
|--|----------------|
| Presidential Advisory Committee                        | 2018 – 2019    |
| Arts and Sciences Curriculum Committee (Member)        | 2018 – present |
| Arts and Sciences General Education Committee (Member) | 2018 – present |

### Departmental/Interdepartmental

|  |                |
|--|----------------|
| Health Professions Advisory Committee (Member)       | 2018 – present |
| Responsible Conduct in Research Committee (Co-Chair) | 2018 – present |

### Professional

Reviewer for American Chemical Society Petroleum Research Fund (1 review)

Reviewer for the *Journal of the American Chemical Society* (1 review)

Reviewer for *Dalton Transactions* (1 review)

Reviewer for *Chemical Science* (5 reviews)

**Previous Professional Service**

Chair of the Chemical Science Division Seminar Series (UC Berkeley)      2012 – 2014