

# Joseph Derosa

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## Current Address

Boston University  
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## Employment:

**Boston University**, College of Arts and Sciences, Department of Chemistry, Boston, MA, USA.  
Assistant Professor of Chemistry, July 2023 – present

**California Institute of Technology**, Division of Chemistry and Chemical Engineering, Pasadena, CA, USA.  
Arnold O. Beckman Postdoctoral Fellow, January 2020 – June 2023  
Research Advisor: Jonas C. Peters, Ph.D.

## Education:

**The Scripps Research Institute**, Skaggs Graduate School of Chemical and Biological Sciences, La Jolla, CA, USA.  
Ph.D. in Chemistry, July 2015 – December 2019  
Research Advisor: Keary M. Engle, Ph.D.

**Macaulay Honors College at The City College of New York**, New York, NY, USA.  
B.S. in Biochemistry, August 2011 – May 2015 (*magna cum laude*)  
Research Advisor: Mark. R. Biscoe, Ph.D.

## Academic Honors and Awards:

Shimadzu Equipment Grant	2024
Arnold O. Beckman Postdoctoral Fellowship	2020–2023
Ruth L. Kirschstein National Research Service Award (NIH F32) [Declined]	2020–2023
Turner B. and Lesly Shelton Award	2018
Abbvie Scholar Award	2018
National Science Foundation Graduate Research Fellowship	2017–2019
Fishman, Meyer, & Gloria Award	2015
Benjamin Harrow Award	2015
Rose Brescia Award	2014
William E. Macaulay Honors Scholarship	2011–2015

## Independent Publications:

- Parnitzke, B., Gerhardt, E.; Xuan, Zi., **Derosa, J.** “Tandem Cobalt-Electrocatalytic Z-Selective Semi-Hydrogenation under Voltage Control.” *In preparation*.
- Guo, Y. ‡, Akana-Schneider, B. ‡, Parnitzke, B. **Derosa, J.** “Methods for Arene Dissociation from eta-6 Arene Transition Metal Complexes.” *Dalton Trans.* **2024**, Submitted. (Invited for “New Talent: Americas” Edition)
- Su, S.; Guo, Y. ‡; Parnitzke, B. ‡; **Derosa, J.** “A Voltage-Controlled Approach Toward Shono-type Amination.” *ChemRxiv* **2024**, DOI: 10.26434/chemrxiv-2024-m411j.

## Mentored Publications (Undergraduate, Graduate, and Postdoctoral):

- Derosa, J.**; Garrido-Barros, P.; Li, M.; Peters, J. C. “Use of a PCET Mediator Enables a Ni-HER Electrocatalyst to Act as a Hydride Delivery Agent.” *J. Am. Chem. Soc.* **2022**, *144*, 20118–20125.
- Apolinar, O. ‡; Kang, T. ‡; Alturaifi, T. M.; Bedekar, P. G.; Rubel, C. Z.; **Derosa, J.**; Sanchez, B. B.; Wong, Q. N.; Sturgell, E. J.; Chen, J. S.; Wisniewski, S. R.; Liu, P.; Engle, K. M. “Three-Component Asymmetric Ni-Catalyzed 1,2-Dicarbofunctionalization of Unactivated Alkenes via Stereoselective Migratory Insertion.” *J. Am. Chem. Soc.* **2022**, DOI: 10.1021/jacs.2c06636.
- Garrido-Barros, P.; **Derosa, J.**; Chalkley, M. J.; Peters, J. C. “Tandem Electrocatalytic N<sub>2</sub> Fixation via Proton-Coupled Electron Transfer.” *Nature* **2022**, *609*, 71–76.
- Derosa, J.**; Garrido-Barros, P.; Peters J. C. “Electrocatalytic Ketyl-Olefin Cyclization at a Favorable Applied Bias Enabled by a Concerted Proton-Electron Transfer Mediator.” *Inorg. Chem.* **2022**, *61*, 6672–6678.
- Kleinmans, R. ‡; Apolinar, O. ‡; **Derosa, J.**; Karunananda, M. K.; Li, Z.-Q.; Tran, V. T.; Wisniewski, S. R.; Engle, K. M. “Nickel-Catalyzed 1,2-Diarylation of Alkenyl Ketones: A Comparative Study of Carbonyl-Directed Reaction Systems.” *Org. Lett.* **2021**, *23*, 5311–5316.

18. **Derosa, J.**‡; Garrido-Barros, P.‡; Peters, J. C. “Electrocatalytic Reduction of C–C  $\pi$ -Bonds *via* a Cobaltocene-Derived Concerted Proton-Electron Transfer Mediator: Fumarate Hydrogenation as a Model Study.” *J. Am. Chem. Soc.* **2021**, *143*, 9303–9307. (‡Authors contributed equally.)
17. Wethman, R.; **Derosa, J.**; Tran, V. T.; Kang, T.; Apolinar, O.; Abraham, A.; Kleinmans, R.; Wisniewski, S. R.; Coombs, J. R.; Engle, K. M. “An Under-Appreciated Source of Reproducibility Issues in Cross-Coupling: Solid-State Decomposition of Primary Sodium Alkoxides in Air.” *ACS Catal.* **2021**, *11*, 502–508.
16. Apolinar, O.; Tran, V. T.; Kim, N.; Schmidt, M. A.; **Derosa, J.**; Engle, K. M. “Sulfonamide Directivity Enables Ni-Catalyzed 1,2-Diarylation of Diverse Alkenyl Amines.” *ACS Catal.* **2020**, *10*, 14234–14239.
15. **Derosa, J.**; Apolinar, O.; Kang, T.; Tran, V. T.; Engle, K. M. “Recent Developments in Nickel-Catalyzed Intermolecular 1,2-Dicarbofunctionalization of Alkenes.” *Chem. Sci.* **2020**, *11*, 4287–4296.
14. Tran, V. T.; Li, Z.; Apolinar, O.; **Derosa, J.**; Wisniewski, S. R.; Eastgate, M. D.; Engle, K. M. “Ni(COD)(DQ): An Air-Stable 18-Electron Ni(0)–Olefin Precatalyst.” *Angew. Chem. Int. Ed.* **2020**, *59*, 7409–7413.
13. Tran, V. T.; Li, Z.; Gallagher, T. J.; **Derosa, J.**; Liu, P.; Engle, K. M. “Nickel-Catalyzed 1,2-Allylmethylation of *N*-Allyl Heterocycles.” *Angew. Chem. Int. Ed.* **2020**, *59*, 7023–7034.
12. **Derosa, J.**‡; Kang, T.‡; Tran, V. T.; Karunananda, M. K.; Jankins, T. C.; Xu, K. L.; Wisniewski, S. R.; Schmidt, M. A.; Eastgate, M. D.; Engle, K. M. “Nickel-Catalyzed 1,2-Diarylation of Alkenyl Carboxylates: A Gateway to 1,2,3-Trifunctionalized Building Blocks.” *Angew. Chem. Int. Ed.* **2020**, *59*, 1201–1205. (‡Authors contributed equally.)
11. Medina, J. M.; Kang, T.; Erbay, T. G.; Shao, H.; Gallego, G. M.; Yang, S.; Tran-Dube, M.; Richardson, P. F.; **Derosa, J.**; Helsel, R.; Patman, R. L.; Wang, F.; Ashcroft, C. P.; Braganza, J. F.; McAlpine, I.; Liu, P.; Engle, K. M. “Cu-Catalyzed Hydroboration of Benzylidenecyclopropanes: Reaction Optimization, (Hetero)Aryl Scope, and Origins of Pathway Selectivity.” *ACS Catal.* **2019**, *9*, 11130–11136.
10. van der Puyl, V. A.; **Derosa, J.**; Engle, K. M. “Directed, Nickel-catalyzed Umpolung 1,2-Carboamination of Alkenyl Carbonyl Compounds.” *ACS Catal.* **2019**, *9*, 224–229.
9. **Derosa, J.**; Kleinmans, R.; Tran, V. T.; Karunananda, M. K.; Wisniewski, S. R.; Eastgate, M. D.; Engle, K. M. “Nickel-Catalyzed 1,2-Diarylation of Simple Alkenyl Amides” *J. Am. Chem. Soc.* **2018**, *140*, 17878–17883.
8. **Derosa, J.**; van der Puyl, V. A.; Tran, V. T.; Liu, M.; Engle, K. M. “Directed Nickel-Catalyzed 1,2-Dialkylation of Alkenyl Carbonyl Compounds.” *Chem. Sci.* **2018**, *9*, 5278–5283.
7. **Derosa, J.**; Tran, V. T.; van der Puyl, V. A.; Engle, K. M. “Carbon–Carbon  $\pi$ -Bonds as Conjunctive Reagents in Cross-Coupling,” *Aldrichimica Acta* **2018**, *51*, 21–32.
6. **Derosa, J.**‡; O’Duill, M. L.‡; Holcomb, M. R.; Boulous, M. N.; Patman, R. L.; Wang, F.; Tran-Dube, M.; McAlpine, I.; Engle, K. M. “Copper-Catalyzed Chan-Lam *O*-Cyclopropylation of Phenols and Aza-Heterocycles,” *J. Org. Chem.* **2018**, *83*, 3417–3425. (‡Authors contributed equally.)
5. **Derosa, J.**‡; Tran, V. T. ‡; Boulous, M. N.; Chen, J. S.; Engle, K. M. “Nickel-catalyzed  $\beta,\gamma$ -Dicarbofunctionalization of Alkenyl Carbonyl Compounds *via* Conjunctive Cross-coupling,” *J. Am. Chem. Soc.* **2017**, *139*, 10657–10660. (‡Authors contributed equally.)
4. **Derosa, J.**; Cantu, A. L.; O’Duill, M. L.; Turnbull, J. L.; Liu, Z.; De La Torre, D. M.; Engle, K. M. “Directed Palladium(II)-Catalyzed *anti*-Hydrochlorination of Unactivated Alkynes with In Situ Generated HCl,” *J. Am. Chem. Soc.* **2017**, *139*, 5183–5193.
3. Liu, Z.; **Derosa, J.**; Engle, K. M. “Palladium(II)-Catalyzed Regioselective *syn*-Hydroarylation of Disubstituted Alkynes Using a Removable Directing Group,” *J. Am. Chem. Soc.* **2016**, *138*, 13076–13081.
2. Wang, C.-Y.; Ralph, G. R.; **Derosa, J.**; Biscoe, M. R. “Stereospecific Pd-Catalyzed Acylation of Enantioenriched Alkylcarbostannatranes: A General Alternative to Asymmetric Enolate Reactions,” *Angew. Chem. Int. Ed.* **2017**, *56*, 856–860.
1. Wang, C.-Y.; **Derosa, J.**; Biscoe, M. R. “The Use of Stable, Optically Active Organometallic Nucleophiles in Cross-Coupling Reactions: A New Approach to Asymmetric Synthesis,” *Chem. Sci.* **2015**, *6*, 5105–5113.

### Mentored Research Activities:

**Metallocene-Mediated Electrocatalytic Proton Coupled Electron Transfer (PCET)**, January 2020 to present.

*Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA.*

Studied the properties of metallocene mediators in PCET processes in the laboratory of Professor Jonas C. Peters designing tunable PCET shuttles through synthetic inorganic and organometallic chemistry. These designer metallocenes were used in electroorganic processes to expand the synthetic repertoire of electrochemical reactions while developing a novel set of reagents effective in H-atom transfer (HAT) processes. Tandem electrocatalytic PCET processes were investigated in the context of N<sub>2</sub> reduction and transition metal hydride generation.

**Selective Alkyne and Alkene Functionalization Utilizing Substrate Directivity**, July 2015 to December 2019.

*Department of Chemistry, The Scripps Research Institute, La Jolla, CA, USA.*

Worked in the research group of Professor Keary M. Engle studying the design and application of removable directing groups for the diverse functionalization of alkenes and alkynes using transition metal catalysis. Specific aims included synthesizing and

analyzing new removable auxiliaries for increased reactivity and improved catalytic turnover, and developing novel transformations that take advantage of intermediate metalacycle formation for high regio- and chemoselectivity. A “next-generation” strategy was achieved using native functional groups (i.e. amides, ketones, carboxylic acids) paired with exogenous ligands under this reaction manifold.

**Novel Use of Alkylcarbostannatranes for the Development of Cross-Coupling Reactions**, June 2013 to May 2015.

*Department of Chemistry, The City College of New York, New York, NY, USA.*

Carried out research with Professor Mark R. Biscoe on developing stereospecific palladium-catalyzed cross-coupling of optically active alkylcarbostannatranes and acyl chlorides. Conducted detailed systematic studies of transmetalation of alkylzinc nucleophiles with carbostannatrane chloride. Specific aims included synthesizing tin-based nucleophiles for the advancement of enantioselective cross-coupling methods.

**Presentations:**

- Chemia (Undergraduate Chemistry Club at BU), “Electrifying Organic Synthesis: Chemistry with Untapped Potential” (*Oral*)
- ACS Spring 2022, “Electrocatalytic PCET as a Synthetic Tool for the (Electro)Organic Chemist” (*Oral*)
- Caltech CCE Seminar Day, September 2021 “Electrocatalytic PCET: Mechanistic Studies and Synthetic Applications” (*Oral*)
- Organometallics GRC Summer 2019, “Nickel-Catalyzed Conjunctive Cross-Coupling with Native Functional Groups” (*Poster*)

**Teaching Experience:**

**CH 645 “Transition Metal Chemistry”**, Spring 2024

*Department of Chemistry, Boston University, Boston, MA, USA.*

**Organometallic Chemistry Teaching Assistant**, March 2019 to June 2019.

*Department of Chemistry, The Scripps Research Institute, La Jolla, CA, USA.*

Instructed students taking graduate-level Organometallic Chemistry. Specific responsibilities were to work with the professor to coordinate and lead weekly problem sessions, to generate examinations and grade assignments, and to teach course material in a lecture-based setting involving chalkboard notes.

**Mentorship Experience:**

**Brett Akana-Schneider**, Postdoctoral Associate, June 2024 – present (*Boston University*)

**Zi Xuan**, Postdoctoral Associate, June 2024 – present (*Boston University*)

**Tegan Poeiro**, Undergraduate Student Research, January 2024 – present (*Boston University*)

**Ethan Gerhardt**, Undergraduate Student Research, January 2024 – present (*Boston University*)

**Siyuan Su**, Postdoctoral Associate, October 2023 – present (*Boston University*)

**Joy Mun**, Undergraduate Student Researcher (for credit), September 2023 – May 2024 (*Boston University*)

**Alan Bunyatov**, Undergraduate Student Researcher, September 2023 – May 2024 (*Boston University*)

**Yahui “Leyla” Guo**, Graduate Student Researcher, September 2023 – present (*Boston University*)

**Bryan Parnitzke**, Graduate Student Researcher, September 2023 – present (*Boston University*)

**Prior to Boston University:**

- Jonas Baumgärtner (Visiting Masters Student; ETH Zurich), May 2022 to March 2023. (*Caltech*)
- Roman Kleinmans (Visiting Masters Student; WWU Münster), September 2018 to March 2019. (*Scripps Research*)
- Vincent A. van der Puyl (Undergraduate Researcher (SURF); UCSD), May 2017 to August 2018. (*Scripps Research*)
- Daizy M. De La Torre (High School Student; LSSI Program), May 2016 to August 2016. (*Scripps Research*)
- Annabelle L. Cantu (Undergraduate Researcher (SURF); CSU Long Beach), May 2016 to August 2016. (*Scripps Research*)
- Mark N. Boulous (Undergraduate Researcher; UCSD), December 2015 to May 2017. (*Scripps Research*)

**Volunteer and Outreach Experience:**

**Diversity, Equity, and Inclusion (DEI) Coordinator**, December 2020 to June 2023.

*Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA, USA.*

Coordinated efforts to promote DEI within the CCE department and in the Peters group in the form of outreach activities and monthly seminars to assess and improve the participation in DEI-related efforts.

**Distinguished Lecture Series (DLS) Coordinator**, August 2018 to August 2019.

*Department of Chemistry, The Scripps Research Institute, La Jolla, CA, USA.*

Co-hosted and coordinated guest speaker visits from academic and industrial settings.

**Vice President, Latino Youth for Higher Education Program (LYHEP)–CCNY Chapter**, April 2013 to May 2014.

*The City College of New York, New York, NY, USA.*

Co-founded and directed the LYHEP–CCNY Chapter. The LYHEP–CCNY Chapter was founded to provide underprivileged, minority students attending inner-city high schools with free tutorials in the fields of history, mathematics, and sciences.

### **Professional Academic Service and Experience**

*Departmental Service at Boston University:*

**Graduate Admissions Committee Member (Organic Representative)**, Fall 2023 – Spring 2024

**Faculty Search Committee Member (Biological Chemistry Search)**, Fall 2023 – Spring 2024

**Department of Chemistry Safety Committee**, Spring 2024

*Reviewing Service:*

**National Science Foundation, Review Panel**, 2024

*Reviewer for Journals:*

**Journal of the American Chemical Society, ACS Catalysis, Organometallics, Organic Letters, Journal of Organic Chemistry, Chemical Communications, Nature Communications, Tetrahedron**

### **Professional Organizations, Honorary Societies, and Affiliations:**

**American Chemical Society**, Member