

MARCUS H. SAK
msak@g.harvard.edu

EDUCATION

Harvard University

Ph.D. Candidate, Department of Chemistry and Chemical Biology

Advisor: Eric N. Jacobsen

Expected graduation: May 2026

Tentative thesis title: Principles in Selective Small-Molecule Catalysis

Cambridge, MA

2021–present

Yale University

B.S./M.S. in Chemistry, *summa cum laude*, Phi Beta Kappa

Grade Point Average: 3.98/4.00

New Haven, CT

2017–2021

RESEARCH EXPERIENCE

Merck & Co., Inc.

Visiting Scientist, Process R&D Enabling Technologies

High-throughput and automated experimentation for combinatorial screening

Boston, MA

Feb–June 2025

Yale University

Advisor: Scott J. Miller

Peptide-catalyzed enantioselective reactions and associated mechanistic/computational studies

New Haven, CT

Jan 2018–May 2021

Justus-Liebig-Universität Giessen

Advisor: Peter R. Schreiner

Synthesis, computational studies, and matrix isolation of minimal mercaptocarbenes

Giessen, Germany

May–Jul 2019

National University of Singapore

Advisor: Yixin Lu

Asymmetric phosphine catalysis of [3 + 2] and [3 + 3] cycloadditions

Singapore

Jun 2015–Jul 2016

PUBLICATIONS

1. [Sak, M. H.[†]](#); Jiang, Y.[†]; Jacobsen, E. N.; Liu, R. Y. Dual-Ligand System for Mild Decarbonylative Suzuki–Miyaura Cross-Coupling of Aryl Chlorides. *ACS Catal.* **2026**, DOI: 10.1021/acscatal.5c08167
2. [Sak, M. H.](#); Liu, R. Y.; Kwan, E. E.; Jacobsen, E. N. Accelerating the Discovery of Cooperative Catalysis. *Nature* **2025**, 648, 333.
3. [Sak, M. H.](#); Jacobsen, E. N. Selective Noncovalent Catalysis with Small Molecules. *Chem. Rev.* **2025**, 125, 8319.
4. [Sak, M. H.[†]](#); Lovinger, G. J.[†]; Jacobsen, E. N. Catalysis of An S_N2 Pathway by Geometric Preorganization. *Nature* **2024**, 632, 1052.
5. Turek, A. K.; [Sak, M. H.](#); Miller, S. J. Kinetic Analysis of a Cysteine-Derived Thiyl-Catalyzed Asymmetric Vinylcyclopropane Cycloaddition Reflects Numerous Attractive Noncovalent Interactions. *J. Am. Chem. Soc.* **2021**, 143, 16173.
6. Chan, Y.-C.; [Sak, M. H.](#); Frank, S. A.; Miller, S. J.; Tunable and Cooperative Catalysis for Enantioselective Pictet–Spengler Reaction with Varied Nitrogen-Containing Heterocyclic Carboxaldehydes. *Angew. Chem. Int. Ed.* **2021**, 60, 24573.
7. Coombs, G.; [Sak, M. H.](#); Miller, S. J. Peptide Catalyzed Fragment Couplings that Form Axially Chiral Non C₂ Symmetric Biaryls. *Angew. Chem. Int. Ed.* **2020**, 59, 2875.

PRESENTATIONS

1. Talk: Accelerating the Discovery of Cooperative Catalysis. December 2025, *Merck & Co. Invited Lecture*, Rahway, NJ
2. Talk: Catalytic Principles in Phosphonium Dealkylation towards *P*-Stereogenic Compounds. July 2025, *ACS DOC Graduate Research Symposium*, San Diego, CA
3. Talk: Catalytic Principles in Phosphonium Dealkylation towards *P*-Stereogenic Compounds. June 2025, *Johnson & Johnson Graduate Research Symposium*, San Diego, CA
4. Talk: Accelerating the Discovery of Cooperative Catalysis. January 2025, *Rowan Scientific Lecture Series*, Boston, MA
5. Poster: Catalysis of An S_N2 Pathway by Geometric Preorganization. July 2024, *Stereochemistry Gordon Research Conference*, Newport, RI.
6. Talk: Catalytic Enantioselective Arbuzov Reaction by Ion Pair Reorganization. *Harvard Chemistry & Chemical Biology Symposium*, May 2023, Cambridge, MA
7. Talk: Efficient data retrieval for large-scale smart city applications through applied Bayesian inference, in *IEEE International Conference on Intelligent Sensors, Sensor Networks, and Information Processing*, 2015, Singapore (Best Paper Nomination)

FELLOWSHIPS

Industry-Sponsored Research Fellowship Merck & Co., Inc.	2024–2026
DAAD Research Internship in Science and Engineering (RISE) German Academic Exchange Service	2019
Alan S. Tetelman 1958 Fellowship for International Research in the Sciences Yale University	2019

HONORS AND AWARDS

Certificate of Distinction in Teaching Harvard University	2023
Exceptional Distinction in the Major (first award since 2015) Werner Bergmann Prize for Outstanding Senior in Chemistry Yale University	2021

TEACHING EXPERIENCE

Harvard University <i>Teaching Fellow</i> <ul style="list-style-type: none">- CHEM 105 (Advanced Organic Chemistry)- CHEM 17 (Principles of Organic Chemistry), CHEM 20 (Organic Chemistry I)	Cambridge, MA 2022–2023
Yale University <i>Quantitative Reasoning/Science Peer Tutor</i> <ul style="list-style-type: none">- General Chemistry I/II- Organic Chemistry I- Physical Chemistry I/II	New Haven, CT 2018–2021

MENTORING EXPERIENCE

Harvard University

Cambridge, MA

- L Thompson (Graduate student, 2025–present)
- Yichen Jiang (Visiting undergraduate, Peking University, Jun–Oct 2025)
- Maximilian Frank (Visiting Masters student, LMU Munich, May–Aug 2025)
- John Rezk (Graduate student, 2022–2025)
- Frank Lee (Harvard College undergraduate, 2022–2025)

SERVICE AND RELEVANT EXPERIENCE

Stereochemistry Gordon Research Seminar

Chair

2024

- Managed finances, applications, and speaker program

Letters to a Pre-Scientist

STEM Professional

2021–2022

- Exchanged letters with rural middle-schoolers about experiences in STEM

Yale Scientific Magazine

Editor in Chief

2020

- Headed editorial and business operations for a national popular science publication
- Performed science demonstrations for local middle- and high-schoolers
- Previously Science Writer and Features Editor

REFERENCES

Eric N. Jacobsen
Harvard University
jacobsen@chemistry.harvard.edu

Richard Y. Liu
Harvard University
richardliu@chemistry.harvard.edu

Scott J. Miller
Yale University
scott.miller@yale.edu