

Christina L. Vizcarra

Associate Professor, Department of Chemistry, Barnard College

3009 Broadway, New York, NY 10027

Ph: 212-851-2747, cvizcarr@barnard.edu

DEGREES IN HIGHER EDUCATION

Ph.D., California Institute of Technology, Pasadena, CA	2008
Discipline: Chemistry	
Attended: 09/02 – 06/08; Degree awarded 06/08	
Advisor: Prof. Stephen L. Mayo	
Thesis: “Development and evaluation of protein design methods for functional targets”	
B.S., University of Kansas, Lawrence, KS	2002
Majors: Chemistry and Mathematics	
Attended: 08/97 – 08/02; Degree awarded 08/02	

PROFESSIONAL EXPERIENCE IN HIGHER EDUCATION

Associate Professor	2024 – present
Assistant Professor	2015 – 2024
Department of Chemistry, Barnard College, New York, NY	
NIH Postdoctoral Fellow	2008 – 2015
Department of Chemistry & Biochemistry, University of California, Los Angeles	
Advisor: Prof. Margot E. Quinlan	
Postdoctoral Researcher	2008
Division of Chemistry & Chemical Engineering, California Institute of Technology, Pasadena, CA	
Advisor: Prof. Stephen L. Mayo	

ACADEMIC & PROFESSIONAL HONORS

Henry Dreyfus Teacher-Scholar Award, <i>Camille and Henry Dreyfus Foundation</i>	2024
Gladys Brooks Faculty Excellence in Teaching Award, <i>Barnard College</i>	2021
Presidential Research Award, <i>Barnard College</i>	2021
Cottrell Scholar Award, <i>Research Corporation for Scientific Advancement</i>	2019
<i>Prior to Barnard</i>	
NIH Postdoctoral Fellowship, <i>National Institutes of Health (NIGMS)</i>	2009 – 2012
Graduate Research Fellowship, <i>National Science Foundation</i>	2003 – 2007
Rosen Fellowship, <i>Caltech</i>	2002 – 2003
Phi Beta Kappa	2002
ACS Scholar, <i>American Chemical Society</i>	2001
Fassnacht Scholarship, <i>Department of Chemistry, University of Kansas</i>	2000
University Scholar, <i>University of Kansas</i>	1998

GRANT ACTIVITY

Active Grants

- Camille and Henry Dreyfus Foundation, Henry Dreyfus Teacher-Scholar Award* 2024 – 2029
Amount of Award: \$75,000, Role: PI
- National Science Foundation, Division of Chemistry* 2023 – 2026
CHE-2320054: “MRI: Acquisition of an inductively coupled plasma mass spectrometer to quantify trace metal ions enabling new research and research training at Barnard College”
Amount of Award: \$238,000
Role: co-PI, with PI Rachel Austin and co-PI’s Logan Brenner, Rebecca Donegan, and Brian Mailloux
- Research Corporation for Scientific Advancement, Cottrell Scholars Collaborative Grant* 2024 – 2026
“CottreLLM: Leveraging artificial intelligence to enhance student learning in computational science courses”
Amount of Award: \$25,000
Role: co-PI, with PI Jay Foley (UNC) and 15 co-PIs

Prior Awards Now Terminated

- NSF Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support (ACCESS) allocation* 2024-2025
BIO240112: “Predicting formin/small-molecule complexes”
3,528.0 GPU hours (estimated value: \$1,283.97), Role: PI
- National Science Foundation, Division of Chemistry* 2017 – 2022
CHE-1710176: “RUI: A mechanistic understanding of the impact of metal ions on the chemistry of metallothionein-3 structure & function in neuronal cells”
Amount of Award: \$294,000
Role: PI, with co-PI Rachel Austin and former-PI Mary Sever (PI, August 2017 – June 2019)
- National Science Foundation, Division of Biological Infrastructure* 2018 – 2021
DBI-1828264: “MRI: Acquisition of an integrated Confocal and TIRF fluorescence microscope for multidisciplinary research and teaching at Barnard College”
Amount of Award: \$563,266
Role: PI, with co-PI’s Jennifer Mansfield and Rae Silver and three major users
- National Institutes of Health, National Institute on Deafness and Other Communication Disorders* 2018 – 2023
1R15DC016462: “Molecular mechanisms underlying formin-associated inherited deafness” (R15-AREA)
Amount of Award: \$424,597, Role: PI
- National Science Foundation, Division of Chemistry* 2018 – 2021
CHE-2135382: “MRI: Acquisition of a 400 MHz Nuclear Magnetic Resonance (NMR) Spectrometer for Research and Research Training at Barnard College”
Amount of Award: \$399,000
Role: Major user, with PI Michael Campbell and co-PI’s Marisa Buzzeo, Dina Merrer, and Christian Rojas
- Research Corporation for Science Advancement, Cottrell Scholars Award* 2019 – 2023
25929: “Small molecule inhibition of formin proteins: specificity and mechanisms of action”
Amount of Award: \$100,000, Role: PI

<i>Extreme Science and Engineering Discovery Environment (XSEDE) Startup Allocation</i>	2020 – 2021
MCB200054: “A molecular view of formin inhibition” 30,000 Service Units (estimated value: \$632), Role: PI	
<i>Research Corporation for Scientific Advancement, Cottrell Scholars Collaborative Grant</i>	2019 – 2021
“Development of the Enhancing Science Courses by Integrating Python (ESCIP) network” Amount of Award: \$25,000 Role: co-PI, with PI Grace Stokes (Santa Clara U.) and six co-PIs	
<i>Barnard College, Presidential Research Award</i>	2021 – 2023
“Structural characterization and drug targeting of the formin/microtubule interaction” Amount of Award: \$50,000, Role: PI	
<i>Research Corporation for Scientific Advancement, Cottrell Scholars Collaborative Grant</i>	2022 – 2024
“Broadening and deepening the ESCIP network: Infusing computational science concepts into STEM courses through multidisciplinary instructor collaborative networks” Amount of Award: \$25,000, Role: co-PI with PI Davit Potoyan (Iowa State U.) and 15 co-PIs	

PUBLISHED WORKS

Barnard undergraduate co-authors underlined, * denotes corresponding authors.

1. **Vizcarra CL**, Trainor RF, McDonald AR, Richardson CT, Potoyan D, Nash JA, Lundgren B, Luchko T, Hocky GM, Foley JJ, Atherton TJ, Stokes GY*, (2024) *An interdisciplinary effort to integrate coding into science courses*, Nature Computational Science, 4: 803–804.
2. de Sousa Lobo Querido R, Ji X, Lakha R, Goodyear RJ, Richardson GP, **Vizcarra CL**, Olson ES* (2023) *Visualizing collagen fibers in the tectorial and basilar membranes using CNA35, a fluorescently labelled bacterial-adhesion protein*, Journal of the Association for Research in Otolaryngology, 24: 147–157.
3. Lakha R, Hachicho C, Mehlenbacher MR, Wilcox DE, Austin RN, **Vizcarra CL*** (2023) *Metallothionein-3 attenuates the effect of Cu²⁺ ions on actin filaments*, Journal of Inorganic Biochemistry, 242: 112157.
4. Orman M, Landis M, Oza A, Nambiar D, Gjeci J, Song K, Huang V, Klestzick A, Hachicho C, Liu SQ, Kamm JM, Bartolini F, Vadakkan JJ, Rojas CM, **Vizcarra CL*** (2022) *Alterations to the broad-spectrum formin inhibitor SMIFH2 modulate potency but not specificity*, Scientific Reports, 12: 13520.
5. Mehlenbacher MR, Elsiesy R, Lakha R, Villones RL, Orman M, **Vizcarra CL***, Meloni G*, Wilcox DE*, Austin RN* (2022) *Metal Binding and Interdomain Thermodynamics of Mammalian Metallothionein 3: Enthalpically Favoured Cu⁺ Supplants Entropically Favoured Zn²⁺ to form Cu₄⁺ Clusters Under Physiological Conditions*, Chemical Science, 13: 5289–5304.
6. Williams SC, Luongo D, Orman M, **Vizcarra CL**, Austin RN* (2022) *An alkane monooxygenase (AlkB) family in which all electron transfer partners are covalently bound to the oxygen-activating hydroxylase*, Journal of Inorganic Biochemistry, 228: 111707.
7. Lakha R, Montero AM, Jabeen T, Costeas CC, Ma J, **Vizcarra CL*** (2021) *Variable autoinhibition among deafness-associated variants of Diaphanous 1 (DIAPH1)*, Biochemistry, 60: 2320–2329.

8. Williams SC, Forsberg AP, Lee J, **Vizcarra CL**, Lopatkin AJ, Austin RN* (2021) *Investigation of the prevalence and catalytic activity of rubredoxin-fused alkane monooxygenases (AlkB_s)*, Journal of Inorganic Biochemistry, 219: 111409.
9. **Vizcarra CL** and Quinlan ME* (2017) *Actin filament assembly by bacterial factors VopL/F: Which end is up?* Journal of Cell Biology, 216: 1211–1213.
10. Bradley AO, **Vizcarra CL**, Bailey H, Quinlan ME* (2020) *Spire stimulates nucleation by Cappuccino and binds both ends of actin filaments*, Molecular Biology of the Cell, 31: 273–286.
11. Silkworth WT, Kunes KL, Nickel GC, Phillips, ML, Quinlan ME*, **Vizcarra CL*** (2018) *The Neuron Specific Formin Delphilin Nucleates but Does Not Enhance Actin Filament Elongation*, Molecular Biology of the Cell, 29: 610–621.
12. AhYoung AP, Koehl A, **Vizcarra CL**, Cascio D, Egea PF* (2016) *Structure of a putative ClpS N-end rule adaptor protein from the malaria pathogen Plasmodium falciparum*, Protein Science, 25: 689–701.
13. Oztug Durer ZA, McGillivray RM, Kang H, Elam WA, **Vizcarra CL**, Hanein D, De La Cruz EM, Reisler E, Quinlan ME* (2015) *Metavinculin tunes the flexibility and the architecture of vinculin-induced bundles of actin filaments*, Journal of Molecular Biology, 427: 2782–2798.
14. **Vizcarra CL**, Bor B, and Quinlan ME* (2014) *The role of formin tails in actin nucleation, processive elongation, and filament bundling*, Journal of Biological Chemistry, 289: 30602–30613.
15. Roth-Johnson EA, **Vizcarra CL**, Bois JS, and Quinlan ME* (2014) *Interaction between microtubules and the Drosophila formin Cappuccino and its effect on actin assembly*, Journal of Biological Chemistry, 289: 4395–4404.
16. Bor B, **Vizcarra CL**, Phillips ML, and Quinlan ME* (2012) *Autoinhibition of the formin Cappuccino in the absence of canonical autoinhibitory domains*, Molecular Biology of the Cell, 23: 3801–3813.
17. Chen MMY, Snow CD, **Vizcarra CL**, Mayo SL, and Arnold FH* (2012) *Comparison of random mutagenesis and semi-rational designed libraries for improved cytochrome P450 BM3- catalyzed hydroxylation of small alkanes*, Protein Engineering, Design & Selection 25: 171–178.
18. **Vizcarra CL**[†], Kreutz B[†], Rodal AA, Toms AV, Lu J, Zheng W, Quinlan ME*, and Eck MJ* (2011) *Structure and function of the interacting domains of Spire and Fmn-family formins*, Proceedings of the National Academy of Sciences USA 108: 11884–11889.
19. **Vizcarra CL**, Zhang N, Marshall SA, Wingreen N, Zeng C, and Mayo SL* (2008) *An improved pairwise decomposable finite difference Poisson-Boltzmann method for computational protein design*, Journal of Computational Chemistry, 29: 1153–1162.
20. Treynor TP, **Vizcarra CL**, Nedelcu D, and Mayo SL* (2007) *Computationally designed libraries of fluorescent proteins evaluated by preservation and diversity of function*, Proceedings of the National Academy of Sciences USA, 104: 48–53.
21. Marshall SA, **Vizcarra CL**, and Mayo SL* (2005) *One- and two-body decomposable Poisson- Boltzmann methods for protein design calculations*, Protein Science, 14: 1293.
22. **Vizcarra CL** and Mayo SL* (2005) *Electrostatics in Computational Protein Design*, Current Opinion in Chemical Biology, 9: 622–626.

COURSES TAUGHT

CHEM BC1003: Chemical Problem Solving
CHEM BC2012: General Chemistry Lab
CHEM BC3282: Biological Chemistry I
CHEM BC3283: Biological Chemistry II
CHEM BC3284: Current Topics in Biochemistry
CHEM BC3346/3348: Advanced Spectroscopy and Analysis Laboratory
CHEM BC3355: Biochemistry Laboratory Techniques
CHEM BC3901/3902: Senior Thesis Seminar
CHEM BC3597/3599: Problems in Chemistry
Chem 156: Physical Biochemistry, UCLA

38 Barnard College undergraduate research students mentored
15 Senior Honors Thesis students

PRESENTATIONS

Invited Talks

1. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry, Lafayette College, Easton, PA, Oct 2025.
2. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry & Biochemistry, Fordham University, Bronx, NY, Apr 2025.
3. *Links between metallothionein 3 and the cytoskeleton*, The American Chemical Society spring meeting, Mar 2024.
4. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry, Bowdoin College, Brunswick, ME, Oct 2023.
5. *Cytoskeletal regulation by formin proteins*, Department of Chemistry, Columbia University, New York, NY, Sep 2023.
6. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Biochemistry and Molecular Biology, SUNY Upstate Medical University, Syracuse, NY, May 2023.
7. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Biochemistry, Albert Einstein College of Medicine, Bronx, NY, May 2023.
8. *Small molecule inhibition of formin proteins*, Neurosurgery Department, Stanford University School of Medicine, Stanford, CA, Apr 2023.
9. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry, New York University, New York, NY, Feb 2023.
10. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry, Santa Clara University, Santa Clara, CA, Feb 2023.

11. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Molecular Biology & Biochemistry, University of California Irvine, Irvine, CA, Feb 2023.
12. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry & Biochemistry, University of California Los Angeles, Los Angeles, CA, Feb 2023.
13. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry & Biochemistry, Cal State University Long Beach, Long Beach, CA, Feb 2023.
14. *Cytoskeletal regulation by formins: effects of disease-associated mutations and small molecule inhibitors*, Department of Chemistry, Wesleyan University, Middletown, CT, Dec 2022.
15. *The inner ear cytoskeleton*, Department of Chemistry & Biochemistry, Cal State University Long Beach, Long Beach, CA, Dec 2020.
16. *Formin proteins: drug targeting and disease-relevant mutational studies*, Department of Chemistry, William Paterson University, Wayne, NJ, Oct 2020.
17. *Cytoskeletal regulation by formins: mechanistic insights and drug targeting*, Department of Biology, University of Richmond, Richmond, VA, March 2019.
18. *Cytoskeletal regulation by formins: mechanistic insights and drug targeting*, Department of Chemistry, St. John's University, Queens, NY, Dec 2018.
19. *Cytoskeletal regulation by formins: mechanistic insights and drug targeting*, Department of Biology, Reed College, Portland, OR, Nov 2018.
20. *Cooperation between the actin regulators Spire and Cappuccino*, Department of Chemistry, Oberlin College, Oberlin, OH, Nov 2013.
21. *Functional studies of the actin regulators Cappuccino and Spire*, Department of Chemistry, Carleton College, Northfield, MN, Nov 2011.
22. *Methods development for computational protein design*, Department of Chemistry, California State Polytechnic University, Pomona, CA, May 2009.

Conference Posters (presenter*, Barnard undergraduate co-authors underlined)

1. Pepper AC*, Ries CE*, Wood DE*, Lebron S, **Vizcarra CL** *Understanding multi-functional cytoskeletal regulation by formins using targeted mutagenesis* American Society for Cell Biology Annual Meeting, Atlanta, GA, March 2026.
2. Yang VT*, Ries CE, **Vizcarra CL** *Purification and characterization of formin homology 2 domains for structural determination of the formin-microtubule complex* Biophysical Society Annual Meeting, Los Angeles, CA, Feb 2025.
3. Orman M, Landis M, Oza A, Nambiar D, Gjeci J, Song K, Huang V, Klestzick A, Hachicho C, Liu SQ, Kamm JM, Bartolini F, Vadakkan JJ, Rojas CM, **Vizcarra CL*** *Activity and mechanism of the pan-formin inhibitor SMIFH2*, American Society for Cell Biology Annual Meeting, Washington, DC, Dec 2022.
4. Lakha R, Montero AM, Jabeen T, Costeas CC, Ma J and **Vizcarra CL*** *Exploring structure, activity, and regulation in deafness-associated variants of Diaphanous 1 (DIAPH1)*, 12th Molecular Biology of Hearing and Deafness Conference, Iowa City, IA, May 2022.

5. de Sousa Lobo Querido R*, Ji X, Makovsky A, Richardson GP, **Vizcarra CL**, Olson ES *Visualizing collagen fibers in the basilar and tectorial membranes using CNA35-OG, a fluorescently labelled bacterial-adhesion protein*, 45th Annual MidWinter Meeting, Association for Research in Otolaryngology (virtual), Feb 2022.
6. Landis M, Song KG, Klestzick A, Huang V, Vadakkan J, Liu SQ, Rojas CM and **Vizcarra CL*** *Structure-activity relationships and mechanism of the formin inhibitor SMIFH2*, American Society for Cell Biology Annual Meeting, Washington, DC, Dec 2019.
7. **Vizcarra CL*** *A molecular view of formin inhibition*, Cottrell Scholars Meeting, Research Corporation for Scientific Advancement, Tuscon, AZ, Jul 2019. (poster and educational talk)
8. Hachicho C*, Austin RN, **Vizcarra CL** *Does metallothionein-3 alter the polymerization kinetics of actin?*, National meeting of the American Chemical Society, Orlando, FL, Apr 2019.
9. Costeas CC, Montero A, Jabeen T and **Vizcarra CL*** *Molecular mechanisms underlying formin associated inherited deafness*, Gordon Conference on Auditory Systems, Smithfield, RI, Jul 2018. (poster and talk selected from abstracts)
10. Costeas CC*, Montero A, Jabeen T and **Vizcarra CL** *Molecular mechanisms underlying formin associated inherited deafness*, American Society for Cell Biology Annual Meeting, Philadelphia, PA, Dec 2017. (poster presented by undergraduate C. Costeas)

SERVICE TO THE COLLEGE/UNIVERSITY

Health Professions Advising Committee (appointed), Barnard College, *Spring 2022–Spring 2025*

Medalist Committee (appointed), Barnard College, *Fall 2016, Fall 2022*

Committee on Instruction (elected), Barnard College, *Fall 2019 – Fall 2020, Fall 2023–Fall 2024*

Manager of shared confocal/TIRF microscope, Barnard College, *Fall 2018 – present*

Barnard faculty search committees: Inorganic Chemistry *Fall 2015*, Biochemistry *Fall 2018, 2019, 2020*

Contributed to the College's Beckman Scholars Program proposal by serving as a potential mentor, *2020 & 2021*

Discussion Facilitator, Inclusive Pedagogy Workshop, Barnard College, *Dec 2017*

Graduate School Panel with Barnard Chemical Society, Barnard College, *Oct 23, 2015*

"Meet the Professor" Lunch with Barnard Chemical Society, *Nov 10, 2015; Nov 4, 2022; Dec 6, 2024*

Academic advisor, first- & second- year students (27 to date) and majors (22 to date)

Barnard Chemistry Senior Honors Thesis committees (16 students from other research groups, plus 15 mentees)

SERVICE TO THE PROFESSION

Co-organizer of The Protein Society's 39th Annual Symposium (San Francisco, CA) Jun 2025

Co-organizer of Pedagogy Workshop Jul 2022

"Enhancing Science Courses by Integrating Python (ESCIP)" Tucson, AZ

Participants in this 2-day workshop included 16 Chemistry, Physics, and Astronomy faculty.

Role: coordinated with three co-PIs, led by Grace Stokes (Santa Clara U.)

- Co-organizer of Virtual Pedagogy Workshop Jun 2020
 “Using Python programming to enhance existing learning objectives”, through ESCIP
Participants in this 1-day online workshop included 40 Chemistry, Physics, and Astronomy faculty
 Role: coordinated with four co-PIs, led by Grace Stokes (Santa Clara U.)
- Co-organizer of Special Interest Subgroup Dec 2019
 “New frontiers in multifactor regulation of cytoskeleton”
 American Society for Cell Biology Annual Meeting
 Role: proposed and co-organized with Elena Grinstevich (Cal State University Long Beach)
- Grant Reviewer, Research Corporation for Scientific Advancement 2021 – present
- Journal Referee 2015 – present
Nature Communications; Biophysical Journal; Journal of Clinical Genetics; The Biophysicist;
Journal of Visual Experiments; The FEBS Journal; FEBS Letters; International Journal of Molecular Sciences;
Protein Engineering, Design & Selection

PROFESSIONALLY-RELATED COMMUNITY SERVICE

- Selection committee member, 2024 Science + Literature Prize Jul 2023 – Dec 2023
 Worked with a committee of five authors and scientists to select awardees in fiction, non-fiction, and poetry, sponsored by the National Book Foundation and Alfred P. Sloan Foundation
- Career day panelist for Columbia Secondary School, New York, NY Mar 2023, Mar 2024
- Career day speaker for Mott Hall Science and Technology Academy, Bronx, NY Ju 2022, Jun 2021
- Guest speaker for Women in STEAM series, Hunter College Elementary School, New York, NY Oct 2018
- Guest speaker at Protein Symposium, Princeton, NJ May 2018