Chris Avanessian

Johns Hopkins University
3400 N Charles St
Baltimore, MD 21218

Email: cavanes1@jhu.edu
avanessian.com

EDUCATION

Johns Hopkins University — Baltimore, MD
Ph.D. in Chemistry, Department of Chemistry — In progress
Advisors: Professor David R. Yarkony (deceased 2024) and Professor Lan Cheng
Research project: "Photodetachment and Light-Matter Interactions Influenced by Conical Intersections."

Union College — Schenectady, NY
B.S. in Chemistry (ACS accredited) and Physics with Honors — June 2021
Valedictorian
Senior thesis: "Microstructural Characterization of Catalytic Copper- and Chromium-Containing Alumina Aerogels."

AWARDS AND RECOGNITIONS

2021	ACS Undergraduate Award in Physical Chemistry
2021	Robert M. Fuller (1863) Senior Prize for outstanding work in chemistry
2021	Professor Frank Titus Memorial Prize in Physics
2021	Michael E. Hagerman Award for Student Mentoring and Professional Development
2020	Student Research Grant for senior thesis work
2020	Union College Research Fellowship for summer research
2020	Charles B. Hurd Prize to an outstanding student pursuing coursework in physical chemistry
2020	Mortimer T. Harvey (1917) Scholarship
2019	Student Conference Travel Grant
2019	Laudise Research Fellowship for summer research
2019	Robert M. Fuller (1863) Sophomore Prize for outstanding work in chemistry
2018	Chemistry Department First-Year Student Prize
2018	Wessel Ten Broeck Van Orden (1839) Prize for excellence in English composition
2017	Goldman Scholars - David Viniar (1976) Scholarship

RESEARCH CONTRIBUTIONS

Refereed Journal Publications

7. "Chromia-alumina catalytic aerogels prepared via rapid supercritical extraction." F. T. Fitzgerald, **C. Avanessian**, J. P. Santos, A. M. Anderson, B. A. Bruno, and M. K. Carroll, *J. Sol-Gel Sci. Technol.* **2025**. doi.org/10.1007/s10971-025-06686-9

6. "Floquet-Engineered Photodissociation Simulated Using Coupled Potential Energy and Dipole Matrices." **C. Avanessian**, Y. Wang, and D. R. Yarkony, *J. Phys. Chem. Lett.* **2024**, *15* (39), 9905–9911. doi.org/10.1021/acs.jpclett.4c02312

5. "The anion photoelectron spectrum and diabatization of tetrazolyl." **C. Avanessian** and D. R. Yarkony, *J. Chem. Phys*. **2024**, *160* (21), 214312. doi.org/10.1063/5.0214635

4. “Effect of slurry processing on the properties of catalytically active copper-alumina aerogel material for applications in three-way catalysis.” A. M. Anderson, B. A. Bruno, J. Santos, **C. Avanessian**, M. K. Carroll, *J. Sol-Gel Sci. Technol*. **2022**, *102* (2), 422–436. doi.org/10.1007/s10971-022-05757-5

3. “Synthesis and characterization of plasmonic peptoid nanosheets.” E. J. Robertson, **C. Avanessian**, J. R. Davis, A. K. Mahony, and E. V. Whitney, *Chem. Comm*. **2021**, *57* (22), 2748–2751. doi.org/10.1039/d1cc00092f

2. “Effect of Copper Loading in Copper-Alumina Aerogels on Three-Way Catalytic Performance.” A. M. Anderson, B. A. Bruno, F. Dilone, M. T. LaRosa, T. F. Andre, **C. Avanessian**, and M. K. Carroll, *Emiss. Control Sci. Technol*. **2020**, *6* (3), 324–335. doi.org/10.1007/s40825-020-00165-z

1. “Analysis and Characterization of Etched Silica Aerogels.” A. M. Stanec, A. M. Anderson, **C. Avanessian**, and M. K. Carroll, *J. Sol-Gel Sci. Technol*. **2020**, *94* (2), 406–415. doi.org/10.1007/s10971-020-05256-5

Oral Presentations

5. “Microstructural characterization of catalytic copper- and chromium-containing alumina aerogels.” **C. Avanessian**, M. K. Carroll, and A. M. Anderson. *31st Steinmetz Symposium, Union College, held virtually. May 22, 2021.* Open access full video recording

4. “Spectroscopic and Microscopic Characterization of Gold-Nanoparticle-Containing Peptoid Monolayer Sheets.” **C. Avanessian** and E. J. Robertson. *30th Steinmetz Symposium, Union College, held virtually. May 22, 2020.* Abstract

3. “Catalytic Copper-Alumina Aerogels: Synthesis, Elemental Mapping and Catalytic Activity.” **C. Avanessian**, F. Dilone, M. K. Carroll, A. M. Anderson, and B. A. Bruno. *30th Steinmetz Symposium, Union College, held virtually. May 22, 2020.* Abstract

2. “Peptoid monolayers as versatile templates for the two-dimensional assembly of hydrophobically modified gold nanoparticle at fluid interfaces.” E. J. Robertson, E. V. Whitney, A. K. Mahony, **C. Avanessian**, and J. Davis. *259th ACS National Meeting held virtually. Mar. 2020.*

1. “Synthesis and Characterization of Copper-Alumina Aerogels.” **C. Avanessian**, F. Dilone, M. K. Carroll, and A. M. Anderson. *New York Six Undergraduate Research Conference in Schenectady, NY. Oct. 26, 2019.*

Poster Presentations

7. “Internal Conversion and Intersystem Crossing in Ammonia Photodissociation Manipulated by a Light-Induced Conical Intersection.” **C. Avanessian**. *29th Dynamics of Molecular Collisions Conference in Snowbird, UT. July 7, 2025.*

6. “The effect of a laser field on ammonia photodissociation simulated on accurate potential energy surfaces.” **C. Avanessian**, Y. Wang, and D. R. Yarkony. *2024 Molecular Interactions and Dynamics Gordon Research Conference and Seminar in Easton, MA. July 8, 2024.*

5. "Simulating the Anion Photoelectron Spectrum of Tetrazolyl with the Time-Independent Multimode Vibronic Coupling Approach." **C. Avanessian** and D. R. Yarkony. *28th Dynamics of Molecular Collisions Conference in Snowbird, UT. July 12, 2023.*

4. "Microstructural characterization of catalytic copper- and chromium-containing alumina aerogels." **C. Avanessian**, M. K. Carroll, and A. M. Anderson. *ACS Spring 2021 National Meeting held virtually. April 21, 2021.*

3. "Microscopic Characterization and Elemental Mapping of Catalytic Aerogels." **C. Avanessian**, M. K. Carroll, and A. M. Anderson. *ACS Northeast Regional Meeting in Saratoga Springs, NY. June 23, 2019.*

2. "Microscopic Characterization and Elemental Mapping of Catalytic Aerogels." **C. Avanessian** and M. K. Carroll. *29th Steinmetz Symposium, Union College, Schenectady, NY. May 10, 2019.*

1. "Calculating Surface Tension with Capillary Waves." **C. Avanessian** and J. Wagner. *29th Steinmetz Symposium, Union College, Schenectady, NY. May 10, 2019.*

TEACHING AND RESEARCH EXPERIENCE

Teaching Apprenticeship

Summer 2025	Johns Hopkins University: Introductory Chemistry I Supervisor: Professor Sunita Thyagarajan

Teaching Assistant

Spring 2023	Johns Hopkins University: Introductory Chemistry II
Fall 2022	Johns Hopkins University: Applied Chemical Equilibrium Lab
Spring 2022	Johns Hopkins University: Introductory Chemistry II
Fall 2021	Johns Hopkins University: Physical Chemistry I

Research Experience

Sep 2018 – June 2021	**Research in materials chemistry, Union College** Advisor: Professor Mary K. Carroll *Project: "Microscopic Characterization and Elemental Mapping of Catalytic Aerogels."*
Sep 2019 – June 2020	**Research in physical chemistry, Union College** Advisor: Professor Ellen J. Robertson *Project: "Liquid-Liquid Interfacial Assembly of Peptoid Sheets."*
Jan 2018 – June 2018	**Student-initiated physics research project, Union College** Advisor: Professor Jef Wagner *Project: "Calculating Surface Tension with Capillary Waves."*

Sep 2017 – June 2018 **Psychology research practicum, Union College**
Advisor: Professor Cay Anderson-Hanley
Project: "Interactive Physical and Cognitive Exercise Study."

OUTREACH

Johns Hopkins University, ChemDNA Graduate Student Mentor
William Barr, incoming graduate student. Provided information and guidance on being a first-year PhD student in the Chemistry Department. (Fall 2024 and Spring 2025)

Johns Hopkins University, ChemDNA Graduate Student Mentor
Minghao Wang, incoming graduate student. Provided information and guidance on being a first-year PhD student in the Chemistry Department. (Fall 2023 and Spring 2024)

Johns Hopkins University, ChemDNA Graduate Student Mentor
Xiuze Wang, incoming graduate student. Provided information and guidance on being a first-year PhD student in the Chemistry Department. (Fall 2022 and Spring 2023)

Johns Hopkins University, Undergraduate Student
Antonella Macoretta, rising second-year undergraduate student. Introduced the research of the Yarkony group and the theory that informs it. (Summer 2022)

WORKSHOPS

2025 Johns Hopkins Teaching Institute
Teaching Academy, Center for Teaching Excellence and Innovation
Johns Hopkins University, Baltimore, MD, May 28-30.

TECHNICAL PROFICIENCY

Python | Fortran | Gaussian | ORCA | MOLPRO | CFOUR | COLUMBUS | SHARC | Avogadro | Jmol | MOLDEN | High-performance computing | Differential scanning calorimetry | Scanning electron microscopy | Energy-dispersive X-ray spectroscopy | Atomic force microscopy | Powder X-ray diffraction | Infrared spectroscopy | UV-vis spectroscopy | ^{1}H and ^{13}C nuclear magnetic resonance spectroscopy | Microsoft Office Suite

ACTIVITIES AND SERVICE

JHU Chemistry Student Safety Committee, Media & Communications subcommittee	2022 – present
Phi Beta Kappa, member	2020 – present
Sigma Pi Sigma, member	2020 – present
Sigma Xi, associate member	2019 – present
American Physical Society, member	2019 – present
American Chemical Society, member	2019 – present
Union College Gaming4U, secretary	2019 – 2021
Union College Chemistry and Biochemistry Club, secretary	2018 – 2021