CAMILLE MCAVOY

PHD SCIENTIST

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camillemcavoy.github.io

EDUCATION

June 2018
California Institute of Technology
PhD, Chemistry (GPA: 3.7/4.0)

June 2012
Massachusetts Institute of Technology
BS, Chemistry and Chemical Engineering, Minor Biology (GPA: 4.5/5.0)

RELEVANT SKILLS

- Protein Expression, Purification, and Analysis
- Chromatography (RP, IEX, SEC, HIC, ChemStation, Empower)
- LC- MS Analysis (Xcalibur, PMI, BioPharma Finder)
- Capillary Electrophoresis (cIEF, CE-SDS,SDS-MCE)
- Structural Biology (EPR, CD, FTIR, Fluorescence anisotropy, Light scattering, PyMOL)
- Molecular Biology (Cloning, Cell Culture, Western Blot)
- Oligonucleotide and Small Molecule Synthesis, Purification, and Analysis (HPLC, NMR)

CAREER OBJECTIVE

My goal is to contribute to novel biopharmaceutical research and development for unmet medical needs by leveraging my interdisciplinary research background in biochemistry, analytical chemistry, chemical engineering, and structural biology.

PROFESSIONAL EXPERIENCE

Jan. 2022 – Present
23andMe
Scientist I, Protein Engineering, South San Francisco, CA
- Contribute to target validation linking 23andMe's genetic database to potential therapeutics through protein production and engineering.
- Clone, express, purify, and characterize proteins of interest from diverse cellular pathways.
- Provide protein for antibody discovery and utilize epitope mapping techniques to better understand protein-antibody interactions.
- Work at the intersection of protein engineering and analytics where I utilize LC-MS to analyze proteins and antibodies of interest.

Feb. 2021 – Nov. 2021
Nektar Therapeutics,
Scientist II, Protein Therapeutics, San Francisco, CA
- Designed, developed, and applied methods for characterization of therapeutic proteins and protein-PEG conjugates.
- Analyzed the structure and dynamic behavior of such molecules.
- Developed chromatographic techniques to separate and quantify species from complex protein-PEG conjugate mixtures.
- Utilized LC-MS and complimentary techniques including cIEF, CE-SDS, and SEC for characterization.

Sept. 2019 - Jan. 2021
AbbVie
Senior Scientist, Oncology Early Development, Redwood City, CA
- Characterized therapeutic antibodies and antibody-drug conjugates using complimentary analytical techniques including LC-MS, SDS-MCE, HIC, and SEC.
- Assessed the composition, glycosylation patterns, and post-translational modifications of oncology drug candidates through these methods to ensure drug stability, potency, and safety.
- Contributed to decisions about cell line choice, cellular growth conditions, formulation conditions, and other critical parameters of clinically relevant antibodies.

July 2018 - Aug. 2019
Ionis Pharmaceuticals
Senior Scientist, Process Research, Carlsbad, CA
- Optimized oligonucleotide drug synthesis for yield and purity using parameters such as coupling conditions, sulfurization reagent and conditions, capping method, and temperature.
- Improved oligonucleotide purity through development of RP and IEX methods.
- Analyzed oligonucleotide products via ion-pair HPLC paired with MS.
- Synthesis and purification methods directly informed the manufacturing process of clinically used oligonucleotide therapeutics.

Dec. 2012-Jun 2018

Caltech Department of Chemistry

Graduate Researcher, Advisors: Dr. Shu-ou Shan and Dr. Douglas Rees, Pasadena, CA

- Characterized structure-function relationship of plant-derived membrane protein chaperone cpSRP43 capable of preventing aggregation of amyloid-beta ($A\beta_{40}$) peptides found in Alzheimer's.
- Used cpSRP43 as a co-expression chaperone in E. coli to increase expression of membrane proteins, which are often very challenging to study because of their low expression.
- Characterized biocatalyzed carbon-carbon bond formation mechanisms for industrial synthesis applications using metalloenzyme nitrogenase with representative substrate methyl isonitrile.
- Trained two undergraduate and two high school researchers to express, purify, and characterize cpSRP43 mutants.
- Membrane protein chaperone research secured a National Institutes of Health R01 grant of approximately $1 million.
- Developed understanding of structural biology strategies at the West Coast Protein Crystallography Workshop and presented work at Protein Society Annual Symposium in Montreal.
- Published work in *PNAS, JBC,* and *JMB*.

PUBLICATIONS

- **C.Z. McAvoy**, A. Siegel, V. Lam, F.-C. Liang, G. Kroon, E. Miaou, P. Griffin, P. Wright, and S. Shan. (2020) A cooperative folding transition activates an ATP-Independent Membrane Protein Chaperone. *JMB, 432, 24*.
- **C. Z. McAvoy**, A. Siegel, S. Piszkiewicz, E. Miaou, M. Yu, T. Nguyen, A. Moradian, M. Sweredoski, S. Hess, and S. Shan. (2018) Two Distinct Sites of Client Protein Interaction with the Chaperone cpSRP43. *JBC, 293, 23*.
- F.-C. Liang, G. Kroon, **C. Z. McAvoy**, C. Chi, P. E. Wright, and S. Shan. (2016) Conformational dynamics of a membrane protein chaperone enable spatially regulated substrate capture and release. *PNAS, 113, 12*.
- M. A. McGowan, **C. Z. McAvoy**, S. L. Buchwald. (2012) Palladium-Catalyzed N-Monoarylation of Amidines and a One-Pot Synthesis of Quinazoline Derivatives. *Organic Letters*, *14, 14*.

SELECTED PRESENTATIONS

- **C. McAvoy**, F.-C. Liang, T. Nguyen, E. Miaou, S. Piszkiewicz, and S. Shan. (2017) Dynamics of Membrane Protein-Chaperone Interaction. Poster Presentation at the Protein Society Annual Symposium, Montreal, Canada.
- **C. McAvoy**. (2015) Inter-domain Dynamics of an ATP-Independent Chaperone. Center for the Chemistry of Cellular Signaling Seminar Series. California Institute of Technology.
- **C. McAvoy**, I. Chen, N. Consul, L. Song, K. Lee, J. Kucharski, and J.-F. P. Hamel. (2012) Development of methodology for the hydrolysis pretreatment of sorghum during the biofuel production process. Society for Industrial Microbiology Conference.