Christopher M. Monaco

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Education

Georgia Institute of Technology, Atlanta, Ga
M.S. Bioinformatics
2018

Georgia Institute of Technology, Atlanta, Ga
B.S. with Honors Electrical Engineering, minor Materials Science and Engineering
2014

Research Experience

Biotechnology Core Facility Branch | *Centers for Disease Control* | Atlanta, Ga **11/2019 – 6/2022**
Microbiologist

- Molecular Assays Development and Evaluation (MADE) Lab
  - Developed click chemistry-based approaches for high-performance oligonucleotide and peptide labeling
  - Collaborated with an international team of independent scientists to develop a LAMP-based diagnostic assay for the detection of SARS-CoV-2 from saliva
  - Assisted with the manufacture of both the CDC COVID-19 qPCR diagnostic kits and the Influenza/COVID-19 multiplex diagnostic kits
  - Evaluate new methods for purification of synthetic oligonucleotides including HILIC, RP, and affinity chromatography
- Laboratory Equipment Design and Development (LED)
  - Established a rapid prototyping service for the design and fabrication of custom lab equipment
  - Maintain and repair complex laboratory equipment such as DNA and peptides synthesizers
  - Design protocols for lab automation using liquid handling robots

Wallace H. Coulter Department of Biomedical Engineering | *Georgia Tech* | Atlanta, Ga **8/2016 – 5/2018**
Graduate Researcher | Dahlman Lab

- Developed a custom analysis pipeline for high throughput characterization of nanoparticles using DNA barcodes
- Created Python scripts to clean, manipulate, and transform raw NGS datasets
- Performed statistical analysis using R on large datasets to create clustered heatmaps
- Assisted with the design of a nested PCR strategy for the addition of Illumina sequencing adapters and custom identifiers into nanoparticle barcodes
- Collaborated with scientists in other labs to design and troubleshoot new protocols and methods
- Prepared internal reports and presentations on the use of software tools and significant findings

Department of Chemistry and Biochemistry | *Georgia Tech* | Atlanta, Ga **8/2010 – 5/2014**
Undergraduate Researcher | Wilkinson Lab

- Investigated the synthesis and characteristics of novel, doped metal fluorides exhibiting negative thermal expansion over broad temperature ranges
- Collected and analyzed characterization measurements of experimental samples using various instruments including x-ray diffractometer, gas pyncometer, and thermogravimetric analyzer
- Independently designed experiments and new synthesis approaches
- Prepared graphics and data for scientific journal articles

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Teaching Experience

Graduate Teaching Assistant | *Georgia Tech* | Atlanta, GA **Fall 2017**

Special Topics: Introduction to Microcontrollers | BME 3801 | Dr. Butera

- Prepared lectures on introductory programming and microelectronics
- Provided feedback and guidance on student projects and homework assignments

Project-based Learning Specialist | *Charles R. Drew Charter School* | Atlanta, GA **8/2016 – 11/2019**

- Guided cross-disciplinary collaborations among K-12 educators in a project-based learning environment
- Trained faculty, staff, and students on various tools and fabrication technologies
- Maintained and repaired various digital fabrication tools across three campuses
- Facilitated integration of project-based learning by assisting teachers with advanced techniques and tools
- Collected, summarized, and visualized makerspace usage data for the school year
- Designed and manufactured museum-quality displays for student work

Outreach Experience

Community Lab Coordinator | *Decatur Makers* | Decatur, GA **2014 – 2021**

Founded and led Atlanta's first Do-It-Yourself Biology (DIYbio) Lab, a community lab space aimed at providing the general public with training and access to the same tools and equipment used by professional scientists.

- Taught classes in micro and molecular biology techniques such as PCR, gel electrophoresis, aseptic technique
- Received grant funding of over $6000 to provide educational opportunities to middle and high school students
- Maintained, repaired, and modified second-hand laboratory equipment
- Developed new, and modified existing, laboratory protocols for use in an informal setting
- Authored standard operating procedures and biosafety protocols in compliance with CDC and NIH guidelines
- Managed appropriate handling, transportation, and disposal of biological materials
- Engaged the public in conversations with professional scientists around current trends and research
- Ensured open science was performed in an ethical and responsible manner

Publications

Monaco CM, Jorgensen E, Ware S. The One Hour COVID Test: A Rapid Colorimetric Reverse-Transcription LAMP–Based COVID-19 Test Requiring Minimal Equipment. Journal of Biomolecular Techniques. 2021;00(00):1-3. doi:10.7171/jbt.21-3203-008

Sago CD, Lokugamage MP, Paunovska K, Daryll A. Vanover, **Monaco CM**, et al. High-throughput in vivo screen of functional mRNA delivery identifies nanoparticles for endothelial cell gene editing. Proceedings of the National Academy of Sciences. 2018;115(42). doi:10.1073/pnas.1811276115

Paunovska K, Sago CD, **Monaco CM**, et al. A direct comparison of in vitro and in vivo nucleic acid delivery mediated by hundreds of nanoparticles reveals a weak correlation. Nano Letters. 2018;18(3):2148-2157. doi:10.1021/acs.nanolett.8b00432

Wilkinson AP, Josefsberg RE, Gallington LC, Morelock CR, **Monaco CM**. History-dependent thermal expansion in NbO2F. Journal of Solid State Chemistry. 2014;213:38-42. doi:10.1016/j.jssc.2014.02.003

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Honors

Bioinformatics Graduate Research Award	Fall & Summer 2017
Faculty Honors	Fall 2010
Dean's List Honor Roll	2009-2014

Technical Skills

Laboratory: Agarose and Acrylamide Gel Electrophoresis, HPLC, Mass Spectrometry, PCR, Isothermal Amplification, Assay Development, Data Collection

Computing: C/C++, Python, R, MATLAB, MySQL, UNIX

Design/Fabrication: OnShape, SolidWorks, Illustrator, Microelectronics, Laser Cutter, 3D Printer, CNC Router

Hobbies and Interests

Teaching • Growing Gourmet Mushrooms • Gardening • Brewing Beer
Creating Electronic Widgets • Product Design and Fabrication • Woodworking