Samuel Morgan Verbanic, PhD

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Professional Profile

Interdisciplinary research scientist with 10 years of experience in academic labs across a wide range of projects in biochemistry, molecular biology, bioinformatics, and bioengineering. Proven track record of innovative experimental design and creative problem solving, continuously finding ways to build and apply a deep skill set to address new challenges. Self-starter undaunted by breaking new ground in areas of minimal prior expertise. Strong written and oral communication skills facilitate collaboration, leadership, and mentorship. Always curious, motivated to grow, and excited about solving global challenges with bioengineering.

Experience

Graduate Student Researcher UCSB, August 2015 – March 2020

- Doctoral work focused on elucidating the role of the microbiome in chronic wound pathology
- Independently conducted two clinical microbiome investigations, from study design to publication
- Used distributed computing, shell scripting, and R to analyze large, multiplexed NGS datasets
- Programmed a user-friendly NGS data processing pipeline for *in vitro* selection experiments
- Administrated lab AWS account and managed network-attached storage drives
- Maintained BSL2 compliance as lab biosafety officer for 5 years with zero incidents or citations
- Fostered collaborations with 5+ labs and institutions across several projects
- Co-authored 6 publications; listed inventor on 1 patent

Postdoctoral Scholar UCLA, March 2020 – Present

- Rapidly built out a new lab and wrote BUA applications, resulting in minimal downtime after a lab move
- Designed large-cohort longitudinal study of diabetic foot ulcer microbiomes and wrote IRB applications
- Continued bioinformatics work on microbiomes, viromes, and *in vitro* evolution experiments
- Explored startup opportunities with our phage-based bacterial detection & killing platform by performing market research, end-user interviews, and funding applications; supported tech transfer by conducting informational sessions with potential licensees

Skills & Techniques

- **Molecular Biology & Biochemistry:** PCR/qPCR, NGS library preparation, Illumina and Oxford Nanopore sequencing, enzymatic reactions, automated liquid handling systems, cloning/genome editing, nucleic acid extraction and purification, bioconjugation, FPLC, HPLC, diagnostic assay development, gel electrophoresis, high-throughput methods, low-biomass methods
- **Bioinformatics & Data Science:** bash, R, Python, Unix, text processing (AWK, sed, grep), git, LaTeX, Excel, Docker, Singularity, AWS/distributed computing, biostatistics, microbiome analyses, metagenomics, high-dimensional data, amplicon data, WGS data, file formats (FASTQ/A, BAM/SAM), pipeline development, conda environments, clinical metadata, network analysis, visualization
- **Microbiology:** Cloning, transformation, protein expression, culturing (BSL2 organisms and bacteriophage), media preparation, maintenance of cell stocks, microscopy
- **Clinical Studies:** study design, logistics, budgeting, procurement, sample processing, IRB and BUA application writing, BSL2 handling protocols, HIPAA compliance

Education

PhD in Biochemistry & Molecular Biology, Bioengineering Emphasis September 2015 – March 2020
University of California, Santa Barbara Santa Barbara, CA

BA in Biochemistry August 2011 – May 2015
Vassar College Poughkeepsie, NY

Patents

- **Targeted Gold Nanoparticles for Detection and Cell Killing in Bacterial Infections**
  Huan Peng, Samuel Verbanic, and Irene A. Chen. *Provisional patent filed, full patent pending (USPTO),* **October 2, 2018**

Publications

- **A Bayesian Nonparametric Analysis for Zero Inflated Multivariate Count Data with Application to Microbiome Study**
  Kurt Shuler, Samuel Verbanic, Irene A. Chen, and Juhee Lee. *Journal of the Royal Statistical Society,* **2020** (*accepted*)
- **EasyDIVER: a pipeline for assembling and counting high throughput sequencing data from *in vitro* evolution of nucleic acids or peptides**
  Celia Blanco*, Samuel Verbanic*, Burckhard Seelig, and Irene A. Chen. *Journal of Molecular Evolution, Journal of Molecular Evolution,* **2020** (88), 477–481
- **Microbial predictors of healing and short-term effect of debridement on the microbiome of chronic wounds**
  Samuel Verbanic, Yuning Shen, Juhee Lee, John Deacon, and Irene A. Chen. *npj Biofilms and Microbiomes,* **2020** (6), 21
- **High throughput sequencing of *in vitro* selection for proteins using mRNA display**
  Celia Blanco, Samuel Verbanic, Burckhard Seelig, and Irene A. Chen. *Physical Chemistry Chemical Physics,* **2020** (22), 6492-6506 *(PCCP 'HOT' article, cover article)*
- **Improved single-swab sample preparation for recovering bacterial and phage DNA from human skin and wound microbiomes**
  Samuel Verbanic, Colin Y. Kim, John Deacon, and Irene A. Chen. *BMC Microbiology,* **2019** (19), 214
- **Vesicle membranes act as simple chaperones for functional RNA**
  Ranajay Saha, Samuel Verbanic, and Irene A. Chen. *Nature Communications,* **2018** (9), 2313
- **A Novel General Chemistry Laboratory: Creation of Biomimetic Superhydrophobic Surfaces through Replica Molding**
  Samuel Verbanic, Owen Brady, Ahmed Sanda, Carolina Gustafson, and Zachary J. Donhauser. *Journal of Chemical Education,* **2014** *91* (9), 1477-1480

Awards & Acknowledgements

- **BMSE/MCDB Retreat & Symposium,** *Best Microbiology Poster Award* UCSB, September 2019
- **Center for Bioengineering Student Seminar,** *Best Speaker Award* UCSB, May 2016
- **Sigma Xi Honors Research Society** Vassar College, May 2015

Teaching & Leadership Experience

Undergraduate Research Mentor, *Chen Lab* UCSB, January 2016 – December 2019
- Mentored 6 undergraduate students in wet lab and computational research, analysis, and presentation
- Mentees were members of UCSB diversity groups Women in STEM and MARC U*STAR

Co-Chair, *BMSE Graduate Student Recruitment Committee* UCSB, January 2016 – December 2019
- Organized events, meetings, and outreach to recruit graduate students to the BMSE program

Teaching Assistant, *Introductory Biology Lab* UCSB, September 2015 – December 2015
- Taught classes of up to 25 students about fundamental lab techniques and principles in biology
- Held office hours, one-on-one tutoring sessions, graded assignments, and revised course material

Hobbies & Interests

Backpacking & camping, cooking & fermentation, skateboarding, reading, board games, and playing guitar.