Gordon T Luu

https://gtluu.github.io/

Objective

Interdisciplinary scientist passionate applying in data science and bioanalytical chemistry to studying natural products through mass spectrometry with an expertise including but not limited to mass spectrometry, liquid chromatography, programming (Python, R, SQL, bash), and NMR. Experienced in analysis of untargeted metabolomics data using existing pipelines/software and developing novel pipelines towards the detection of small molecules of interest. Currently in search of scientist positions as a mass spectrometrist.

Education

University of California, Santa Cruz — Jan 2021 – Present
PhD Candidate in Chemistry

University of Illinois at Chicago — Aug 2018 – Dec 2020
PhD Candidate in Pharmacognosy (transferred)

San Francisco State University — Aug 2013 – May 2018
Bachelor of Science in Microbiology
Minor in Chemistry
Graduated *cum laude*

Research Experience

PhD Candidate
University of California, Santa Cruz — Jan 2021 – Present
University of Illinois at Chicago (transferred) — Aug 2018 – Dec 2020
Advisor: Dr. Laura Sanchez

- The goal of my thesis work is to interrogate the cheese rind microbiome and human vaginal microenvironment using multi-omics technologies to assess chemical signaling pathways.
- Cheese Rind Microbiome: I use mass spectrometry-based untargeted metabolomics and genome mining to analyze complex community interactions to 1) determine their ecological roles, and 2) identify potential dietary health benefits.
- Human Vaginal Microbiome: I use mass spectrometry-based proteomics to detect and identify ovarian cancer biomarkers, which can be used to inform new screening/diagnostic procedures.
- Software and Data Analysis Pipelines: I write software and design data analysis pipelines for the above projects and others in the Sanchez Lab in order to streamline proper data analysis workflows.

Intern, Data and DNA Sequencing — Jun 2022 – Sep 2022
Hexagon Bio
Supervisor: Dr. Joseph Spraker

- The goal of my internship was to utilize mass spectrometry towards generating diverse microbial and genome libraries from environmental collections.
- I developed laboratory processes and data analysis pipelines in R/Python to determine the feasibility of mass spectrometry as a strain dereplication and prioritization tool in a high throughput fashion.

Undergraduate Research Assistant Apr 2016 – Jul 2018
San Francisco State University
Advisor: Dr. Taro Amagata

- I generated and screened a chemical extract library from Actinomycetes to prioritize strains producing unknown cytotoxic secondary metabolites requiring isolation, genome mining, and structure elucidation for discovery of novel anti-cancer therapeutics.

Awards

2022	University of California Santa Cruz Fink Graduate Student Award
2022	University of California Santa Cruz Dissertation Year Fellowship
2022	University of California Santa Cruz Graduate Dean's Research Travel Grant
2022	American Society for Mass Spectrometry Graduate Student Travel Award
2020	University of Illinois Cancer Center Cancer Science Prize – Poster 2nd Place
2020	2020 Oscar Robert Oldberg Prize in Pharmaceutical Chemistry
2020	BUCHI Scholar Award 2020 Runner Up
2020	Ruth L. Kirschstein National Research Service Award (NRSA) Institutional Research Training (T32) Grant Award
2019	Northeastern University May Institute Travel Fellowship
2018	San Francisco State University College of Science and Engineering 20th Annual Student Showcase – Poster Section UL 3rd Place

Publications

10. Jarmusch, A.K., Aron, A.T., Petras, D., Phelan, V.V., Bittremieux, W., Acharya, D.D., Ahmed, M.M.A., Bauermeister, A., Bertin, M.J., Boudreau, P.D., Borges, R.M., Bowen, B.P., Brown, C.J., Chagas, F.O., Clevenger, K.D., Correia, M.S.P., Crandall, W.J., Crüsemann, M., Damiani, T., Fiehn, O., Garg, N., Gerwick, W.H., Gilbert, J.R., Globisch, D., Gomes, P.W.P., Heuckeroth, S., James, C.A., Jarmusch, S.A., Kakhkhorov, S.A., Kang, K.B., Kersten, R.D., Kim, H., Kirk, R.D., Kohlbacher, O., Kontou, E.E., Liu, K., Lizama-Chamu, I., **Luu, G.T.**, Knaan, T.L., Marty, M.T., McAvoy, A.C., McCall, L., Mohamed, O.G., Nahor, O., Niedermeyer, T.H.J., Northern, T.R., Overdahl, K.E., Pluskal, T., Rainer, J., Reher, R., Rodriguez, E., Sachsenberg, T.T., Sanchez, L.M., Schmid, R., Stevens, C., Tian, Z., Tripathi, A., Tsugawa, H., Nishida, K., Matsuzawa, Y., van der Hooft, J.J.J., Vicini, A., Walter, A., Weber, T., Xiong, Q., Xu, T., Zhao, H.N., Dorrestein, P.C., Wang, M. (2022). A Universal Language for Finding Mass Spectrometry Data Patterns. *bioRXiv*. doi: 10.1101/2022.08.06.503000.

9. **Luu, G.T.**, Ge, C., Tang, Y., Li, K.L., Cologna, S.M., Burdette, J.E., Su, J., Sanchez, L.M. (2022). An integrated approach to protein discovery and detection from complex biofluids. *bioRXiv*. doi: 10.1101/2022.01.03.474834. *Submitted to PNAS. In Revision.*

8. **Luu, G.T.**, Freitas, M.A., Lizama-Chamu, I., McCaughey, C.S., Sanchez, L.M., Wang, M. (2021). TIMSCONVERT: A workflow to convert trapped ion mobility data to open formats. *Bioinformatics*. btac419. doi: 10.1093/bioinformatics/btac419.

6. **Luu, G.T.**, Galey, M.M., Sanchez, L.M. (2020). Optimization of protein extraction from tampons for mass spectrometry-based ovarian cancer biomarker discovery. *BUCHI Application Note*. https://www.buchi.com/us-en/node/11206.

7. **Luu, G.T.** and Sanchez, L.M. (2021). Towards improvement of screening through mass spectrometry-based proteomics: ovarian cancer as a case study. *International Journal of Mass Spectrometry*. 469: 116679. doi: 10.1016/j.ijms.2021.116679.

5. **Luu, G.T.***, Condren, A.R.*, Kahl, L., Dietrich, L., Sanchez, L.M. (2020). Evaluation of data analysis platforms and compatibility with MALDI-TOF imaging mass spectrometry data sets. *Journal of The American Society for Mass Spectrometry*. 31(6): 1313-1320. doi:10.1021/jasms.0c00039.

4. Caudill, V.R., Qin, S., Winstead, R., Kaur, J., Tisthammer, K., Pineda, E.G., Carja, O., Eggo, R.M., Koelle, K., Lythgoe, K., Roy, S., Allen, N., Aviles, M., Baker, B.A., Bauer, W., Bermudez, S., Carlson, C., Catalan, F.L., Chemel, A.K., Evans, D., Fiutek, N., Fryer, E., Goodfellow, S.M., Hecht, M., Hopp, K., Hopson Jr., E., Jaberi, A., Kinney, C., Lao, D., Le, A., Lo, J., Lopez, A.G., Lopez, A., Lorenzo, F.G., **Luu, G.T.**, Mahoney, A., Melton, R.L., Nascimento, G.D., Pradhananga, A., Rodrigues, N.S., Shieh, A., Singh, R., Sulaeman, H., Thu, R., Tran, K., Tran, L., Winters, E.J., Wong, A., Pennings, P.S. (2020). CpG-creating Mutations are Costly in Many Human Viruses. *Evolutionary Ecology.* 34(3):339-359. doi: 10.1007/s10682-020-10039-z.

3. Spraker, J.E., **Luu, G.T.**, Sanchez, L.M. (2019). Imaging mass spectrometry for natural products discovery: a review of ionization methods. *Natural Product Reports*. 37(2): 150-162. doi:10.1039/c9np00038k.

2. Grim, C.M.*, **Luu, G.T.***, Sanchez, L.M. (2019). Staring into the void: demystifying microbial metabolomics. *FEMS Microbiology Letters*. 366(11): fnz135. doi:10.1093/femsle/fnz135.

1. Cleary, J.L., **Luu, G.T.**, Pierce, E.C., Dutton, R.J., Sanchez, L.M. (2019). BLANKA: an Algorithm for Blank Subtraction in Mass Spectrometry of Complex Biological Samples. *Journal of The American Society for Mass Spectrometry*. 30(8): 1426-1434. doi:10.1007/s13361-019-02185-8.

* indicates co-first authorship

Oral Presentations

16. **Luu, G.T.*** Strain Dereplication and Prioritization Towards Diverse Microbial Libraries. Oral Presentation at UCSC Small Metabolite Community. Santa Cruz, CA. September 2022.

15. **Luu, G.T.*** and Sanchez, L.M. TIMSVISION: how can isomers be real if our programs aren't real?. Oral Presentation at UCSC Chemistry and Biochemistry Annual Fall Conference 2022. Santa Cruz, CA. September 2022.

14. **Luu, G.T.*** and Sanchez, L.M. Using Mass Spectrometry Based Metabolomics to Uncover Microbial Interactions in the Cheese Rind Microbiome. Oral Presentation at UCSC Small Metabolite Community. Santa Cruz, CA. April 2022.

13. **Luu, G.T.***, Lizama-Chamu, I., McCaughey, C.S., Sanchez, L.M., Wang, M. Leveraging Mass Spectrometry Data for Natural Product Discovery. Oral Presentation at UCSC Small Metabolite Community. Santa Cruz, CA. March 2022.

12. **Luu, G.T.***, Cologna, S.M. Burdette, J.E., Sanchez, L.M. Tampons as a Source of Proteins for MALDI-TOF Based Profiling to Screen for Ovarian Cancer. Oral Presentation at American Society of Mass Spectrometry Annual Conference 2021. Philadelphia, PA. October 2021.

11. **Luu, G.T.*** and Sanchez, L.M. MALDI-TOF Based Ovarian Cancer Screening Using Proteins Sourced from Tampons. Oral Presentation at UCSC Chemistry and Biochemistry Annual Fall Conference 2021. Santa Cruz, CA. September 2021.

10. Wang, M.* and **Luu, G.T.*** The Mass Spectrometry Query Language – A flexible way to discover, explore and extract mass spectrometry data. Oral Presentation at UIC Small Metabolite Community. Virtual. September 2021.

9. **Luu, G.T.*** and Sanchez, L.M. A Potential Ovarian Cancer Biomarker Identified from Murine Vaginal Lavages Using Bottom-Up Proteomics. Oral Presentation at Chemical Biology in the Bay Area Day 2021. Virtual. May 2021.

8. **Luu, G.T.*** and Sanchez, L.M. Identification of Ovarian Cancer Biomarkers from Murine Vaginal Lavages Using Bottom-Up Proteomics. Oral Presentation at University of California Chemical Symposium 2021. Virtual. March 2021.

7. **Luu, G.T.***, Galey, M.M., Sanchez, L.M. Optimization of protein extraction from tampons for mass spectrometry-based ovarian cancer biomarker discovery. Recorded Oral Presentation for BUCHI Online Webinar. Virtual. November 2020. https://buchi.showpad.com/share/RmvYjCCoqE2hPWrZKntTc

6. **Luu, G.T.***, Kishore, S., Sanchez, L.M. BLANKA: a tool for Blank Subtraction in Mass Spectrometry of Complex Biological Samples. Flash Talk at Global Natural Products Social First User Meeting. Virtual. August 2020.

5. **Luu, G.T.***, Kishore, S., Sanchez, L.M. BLANKA: a tool for Blank Subtraction in Mass Spectrometry of Complex Biological Samples. Flash Talk at Chicago Mass Spec Day 2020. Virtual. August 2020.

4. **Luu, G.T.*** and Sanchez, L.M. Complex Community Metabolome Interactions from the Cheese Rind-Derived Microbiome. Oral Presentation at American Society for Pharmacognosy 2020 Young Members Symposium. Virtual. August 2020.

3. **Luu, G.T.*** and Sanchez, L.M. Discovery of Ovarian Cancer Biomarkers Using Bottom Up Proteomics. Oral Presentation at UIC Small Metabolite Community. Chicago, IL. April 2020.

2. **Luu, G.T.*** and Sanchez, L.M. Cheese-Rind Microbes: Untargeted metabolomics of complex biological systems. Oral Presentation at UIC Small Metabolite Community. Chicago, IL. February 2019.

1. **Luu, G.T.*** and Amagata, T. Discovery of Novel Cytotoxic Secondary Metabolites in Actinomycetes Through Analysis of Biosynthetic Gene Clusters. Oral Presentation at UC Berkeley 19th Annual Microbiology Student Symposium. Berkeley, CA. April 2018.

* indicates presenter(s)

Posters

9. **Luu, G.T.*** and Sanchez, L.M. A workflow for dereplicating Small Molecules via Ion Mobility and Mass Spectrometry. Poster at Chemical Biology in the Bay Area Day 2022. San Francisco, CA. May 2022.

8. **Luu, G.T.***, Lizama-Chamu, I., McCaughey, C.S., Sanchez, L.M., Wang, M. Leveraging Mass Spectrometry Data for Natural Product Discovery. Poster at Marine Natural Products Gordon Research Conference 2022 and Gordon Research Seminar 2022. Ventura, CA. March 2022.

7. **Luu, G.T.***, Little, J.C., Pierce, E.C., Dutton, R.J., Sanchez, L.M. Using Tripartite Communities to Identify Bacterial-Fungal Interactions in the Cheese Rind Microbiome. Poster at American Society of Pharmacognosy Vanguards of Natural Product Research 2021. Virtual. July 2021.

6. **Luu, G.T.***, Galey, M.M., Sanchez, L.M. Optimization of protein extraction from tampons for mass spectrometry-based ovarian cancer biomarker discovery. Poster at University of Illinois at Chicago College of Pharmacy Research Day 2020. Virtual. November 2020.

5. **Luu, G.T.***, Cleary-Little, J.L., Pierce, E.C., Dutton, R.J., Sanchez, L.M. Complex Community Metabolome Interactions from the Cheese Rind-Derived Microbiome. Poster at American Society of Mass Spectrometry Annual Conference 2020 Reboot. Virtual. June 2020.

4. **Luu, G.T.***, Grim, C.M.*, Zink, K., Burdette, J., Sanchez, L.M. Investigation of the metabolites in ovarian cancer using imaging mass spectrometry. Poster at Chicago Mass Spec Day. Chicago, IL. July 2019.

3. **Luu, G.T.***, Bray, W.M., Lokey, R.S., Amagata, T. Discovery of Novel Secondary Metabolites from Streptomyces sp. CP26-58. Poster at SFSU COSE 20th Annual Student Showcase. San Francisco, CA. May 2018.

2. **Luu, G.T.*** and Amagata, T. Discovery of Novel Cytotoxic Secondary Metabolites in Actinomycetes Through Analysis of Biosynthetic Gene Clusters. Poster at UC Berkeley 19th Annual Microbiology Student Symposium. Berkeley, CA. April 2018.

1. **Luu, G.T.***, Bray, W.M., Lokey, R.S., Valeriote, F.A., Amagata, T. A New Cytotoxic Furaquinocin Isolated from the Marine-Derived Streptomyces sp. CP53-67. Poster at CSUPERB 2018. Santa Clara, CA, January 2018.

* indicates presenter(s)

Mentoring

Shreya Keyshore — Jun 2020 – Aug 2020
Haverford College

Kiley Cleland, ACCESS Student — Jun 2021 – Aug 2021
Cabrillo College

Celine Ertekin, Volunteer — Oct 2021 – Present
University of California, Santa Cruz

Eowyn Acres, Volunteer — Oct 2021 – Present
University of California, Santa Cruz

Teaching Experience

CHEM 272: Mass Spectrometry: Fundamentals and Applications — Apr 2022 – Jun 2022
University of California, Santa Cruz Department of Chemistry and Biochemistry

PHAR 504 Pathophysiology, Drug Action, and Therapeutics (PDAT) 5: Immunology/Respiratory — Aug 2019 – Dec 2019
University of Illinois at Chicago College of Pharmacy

PHAR 505 Pathophysiology, Drug Action, and Therapeutics (PDAT) 5: Cardiovascular — Jan 2019 – May 2019
University of Illinois at Chicago College of Pharmacy

PHAR 503 Pathophysiology, Drug Action, and Therapeutics (PDAT) 5: Renal, Electrolytes, and Nutrition — Aug 2018 – Dec 2018
University of Illinois at Chicago College of Pharmacy

Supplemental Instruction Facilitator — Aug 2016 – May 2018
Calculus II and General Chemistry I
San Francisco State University College of Science and Engineering

CHEM 335 Organic Chemistry — Aug 2017 – Dec 2017
San Francisco State University College of Science and Engineering

Outreach Activities

Expand Your Horizons Chicago 2021 and 2022 Conference — Mar 2021, Mar 2022

- Non-profit organization that hosts one day symposiums aimed at introducing STEM careers to middle school-aged girls through engaging activities and workshops.
- Workshop: Cheese Rind Microbes: Introducing a Taste of Science – One-hour workshop adapted to a virtual format designed to provide a high-level overview of microbial diversity in fermented foods, including virtual activities and discussion on microbial diversity and metabolites.
- https://gtluu.github.io/eyh2021/

Skype A Scientist — Oct 2020

- Skype A Scientist aims to connect students in classrooms to scientists.
- As a microbiologist, I spoke to a 6th grade class interested in the human microbiome and the life of a scientist.
- Communicated work on the cheese microbiome and answered questions related to my work and life as a student/scientist.

Expand Your Horizons 2020 Conference (canceled Due to COVID-19) — Mar 2020

- Workshop: Cheese Rind Microbes: Introducing A Taste of Science – One-hour workshop designed to provide a high-level overview of microbial diversity in fermented foods, including hands-on microbiology demonstrations and discussion on microbial diversity and metabolites.

NSF Cheese Outreach Module — Sep 2018 – Oct 2018

- Set of three workshops for the education of elementary school aged students from underserved communities on microbial diversity using the cheese microbiome as a model system for fermented foods.

Extracurricular Activities

UCSF COVID-19 Hackathon — May 2020
Team 38 – UCSF Doctor's Academy Student Tracker Tool

- In collaboration with the UCSF Fresno Latino Center for Medical Education and Research (LaCMER), the Doctor's Academy program aims to prepare high school students from economically or educationally disadvantaged backgrounds for careers as future healthcare professionals.
- Learned front and back-end technologies to create a basic web application using Python, MySQL, Flask, SQLAlchemy, HTML, CSS, and Javascript to assist in tracking UCSF Doctor's Academy student academic progress.