

Karatatiwant Singh Sidhu

SCIENTIST - ANALYTICAL CHEMISTRY/ METABOLOMICS

Chandigarh, India

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Education

Master of Science in Biotechnology - Texas A&M University

College Station, Texas, USA

- GPA: 3.88/4

2015-2017

Bachelor of Engineering in Biotechnology - Panjab University

Chandigarh, India

- GPA: 7.58/10
- Ranked 7th out of a class of 78

2011-2015

Professional & Research Experience

Lab Research Technician, University of Vermont

July 2017 - December 2021

Analytical Chemistry, Proteomics and Mass Spec Facility, Department of Chemistry

Burlington, Vermont, USA

- Analysis and development of assays for stable isotopes of metabolites using a high-resolution Waters Xevo-G2-XS-QToF with an Acquity M-Class UPLC.
- Creation of workflows to characterize, profile and measure metabolomics pathways using LC techniques such as hydrophilic interaction liquid chromatography (HILIC) and reverse phase LC.
- Development of high throughput MRM assays for quantification of amino acids in biological cell culture media using an ABSciex 4000 QTRAP with a Shimadzu SIL-20A HPLC.
- Execution and generation of complex fluxomics & metabolomics methods for biological pathway analysis including glycolytic, TCA and PPP pathways.
- Formulation of proteomics methods and quantification strategies for stable isotope labeled (SIL) & tryptic peptides for human and mouse proteins, resulting in departmental funding from a NIH R01 grant.
- Maintenance and troubleshooting of high-resolution mass spectrometer and UPLC equipment, lab inventory, safety, and standard operating protocols.

Graduate Assistant, Texas A&M University

Feb 2016 - May 2017

CTRAL, Texas A&M - Analytical Chemistry - BSL-2 Facility

College Station, Texas, USA

- Optimization, development, and analysis of assays for amino acid stable isotopes to successfully measure low isotopic levels in human biological samples on an Eksigent microLC200 and ABSciex 5500 QTRAP MS.
- Establishment and streamlining of workflow and sample preparation protocols by ~1hr per study by carrying out buffer testing and by conducting thorough stability analysis for human serum samples.
- Design and development of efficient gradients for LC analysis of bis-Fmoc amino acids and formulation of working gradients by pressure maintenance and column conditioning/troubleshooting.
- Preparation and derivatization of biological samples (including human serum, plasma and whole blood) for testing on high performance chromatography equipment.

Isotope Analysis - Intern, Texas A&M University

May 2016 - August 2017

CTRAL, Texas A&M - Analytical Chemistry - BSL-2 Facility

College Station, Texas, USA

- Analysis and testing of human biological samples by formulating bio-analytical assays.
- Development and analysis of enrichment and isotope dilution assays for human and pig plasma samples to quantify analytes including Urea (13C), Urea(15N2), Alanine(D4), Phenylalanine(ring-13C6)
- Establishing MS/MS parameters and validation assays for analytes including Spermine, Spermidine, Putrescine & Methionine Sulfoxide using syringe pump infusions and integrated LC chromatograms to develop methods for clinical testing measuring robustness, linearity and inter-day stability.

Graduate Research Assistant, Texas A&M University

January 2016 - May 2016

Office of Tech Commercialization

College Station, Texas, USA

- Worked on developing a novel technology for curing and preventing Pierce's Disease in grapes for the Texas wine industry and providing a product to market strategy.

HPLC/ R&D - Intern, Ind-Swift Industries

June 2014 - July 2014

Research and Development Internship

Mohali, Punjab, India

- Worked in a high throughput industrial R&D lab for sample prep and sample analysis on a reverse phase HPLC/UV equipment.

Vaccine Development - Intern, C.R.I.

June 2013 - July 2013

Central Research Institute , Govt. Of India

Kasauli , Himachal Pradesh, India

- Trained in QC procedures for DPT and tetanus vaccines produced by Government of India in a GMP facility.

Research

PEER-REVIEWED PUBLICATIONS

- Abreu, S. C. **Sidhu KS** , *et al.* Differential effects of the cystic fibrosis lung inflammatory environment on mesenchymal stromal cells. **American Journal of Physiology-Lung Cellular and Molecular Physiology** 319, L908–L925 (2020) <https://doi.org/10.1152/ajplung.00218.2020>
- Giddings, E.L., Champagne, D.P., Wu, MH., **Sidhu KS** *et al.* Mitochondrial ATP fuels ABC transporter-mediated drug efflux in cancer chemoresistance. **Nat Commun** 12, 2804 (2021). <https://doi.org/10.1038/s41467-021-23071-6>
- **Sidhu KS**, Amiel E, Budd RC, Matthews DE. Determination of cell volume as part of metabolomics experiments. **American Journal of physiology. Cell Physiology**. 2021 Dec;321(6):C947-C953 <https://doi.org/10.1152/ajpcell.00613.2020>

PRESENTATIONS

- Isotope Dilution Assays for Alanine using a triple quadrupole MS, *Annual Advisory Committee Conference, Biotechnology*, 2017
- Determination of cell volume as part of metabolomics, *ASMS*, 2021
- Role of Bacteriophages in Pierce's Disease prevention in grapes, *Annual PPIB Conference, Texas A&M*. 2016
- BiocAMP, Panjab University, 2015

Skills

LC/MS AB SCIEX 5500, 4000, 2000 Waters Xevo-G2-XS QTOF, Acquity M Class UPLC, Eksigent microLC200, Eksigent HT-Ultra, CTC-PAL

Software Analyst, Multi-Quant, PLGS, Progenesis Q1, XCMS, TargetLynx, El-Maven, Microsoft Project, MS Excel

Techniques Cell & Tissue Culture, Analytical Chemistry, HPLC/ UPLC, MS/MS, PCR, Electrophoresis, Sample Prep, Method Development

Coding R, Python, Rmarkdown, Jupyter, git, HTML, CSS

Languages English (Fluent), Hindi(native), Punjabi (native), French (intermediate)

Stipends & Awards

Biotechnology Graduate Student Fellowship 2015-2016

Biotechnology Advisory Council Award 2017

Certificate of Entrepreneurship, Mays Business School, Texas A&M 2017

Outstanding Graduate Award , Texas A&M University 2017

NIH - P30 GM118228 2017-2021

NIH - S10 OD018126 2017-2021

Leadership Experience

Biotechnology Society, Texas A&M University, Secretary 2015 - 2016

Society of Biological Engineering (SBE-UIET), Board Member, Head of Creative Team 2013 - 2015

MagBOARD UIET, Co-Convener, Executive Member 2013 - 2015

TEDx Panjab University, Organizing Committee 2014