

Sara Jeanne Dunaj

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EDUCATION:

- 2015 – 2018 (expected) **University of Massachusetts Lowell:** Lowell, MA
PhD: Biomedical Engineering and Biotechnology
Specialization Area: Biomedical Information Systems–Bioinformatics and Genomics
Advanced Standing
- 2011 **University of Massachusetts Lowell:** Lowell, MA
Master of Science: Biological Sciences – GPA: 4.0
- 2009 **University of Massachusetts Lowell:** Lowell, MA
Bachelor of Science: Biology, Minor: Clinical Laboratory Sciences – GPA: 3.745
Honors: Magna Cum Laude

SPECIALIZED SKILLS:

Bioinformatics • Biomarker and High Throughput Assay Development • DNA and RNA Extraction, Purification, and Quantification • High Performance Computing • Laboratory Automation (Tecan) • Microbial Metagenomics • Multiplex Ligation-dependent Probe Amplification and Analysis • Next Generation Sequencing and Data Analysis • Project Management • Quantitative PCR • R • Rare Mutation Enrichment and Detection • UNIX

RESEARCH EXPERIENCE:

- 2017 – Current **RaNA Therapeutics (Cambridge, MA)**
Bioinformatician
Running and Updating/ Developing RNA Sequencing Pipeline (Shell Scripting) for multiple studies (Human, Mouse, and Cynomolgus Monkey) – FASTQ, Trimmomatic, Bowtie2, STAR, Picard Tools, HTSeq, RNASeQC, deepTools; Python Scripting (developing modules for RNA-Seq pipeline); Differential Gene Expression Analysis with R – Limma, DESeq, EdgeR.
- 2015 – Current **UMass Lowell and Rowland Institute of Harvard University**
Graduate Research
Garb Laboratory, Biology Department
Brucker Laboratory, Host-Microbe and Toxicity Group
PhD Dissertation Research: *Bioinformatics; High Performance Computing; MinION Sample Library Preparation, Arthropod Microbiome DNA Extraction, Purification and Quantification; 16S rRNA Gene Amplicon Library Preparation; 16S Metagenomics NGS*

Data Analysis - QIIME; UNIX; RNA Sequencing Data Analysis – FastQC, TrimGalore, Trinity.

2016

Epizyme (Cambridge, MA)**Senior Research Associate**

Translational Medicine and Biology Departments

Responsibilities: *Bioinformatics; NGS Data QC and Analysis (Variant Calling and Assay Development); DNA Extraction, Purification, and Quantification; NGS Assay Support and Consultation.*

2014 – 2015

Good Start Genetics (Cambridge, MA)**Research Associate**

Research and Development

Responsibilities: *Carrier Screening Assay Development; Cell Culture; Data and Statistical Analysis (R and MS Excel); DNA Extraction Method Development; DNA Quantification/Qualification; Capillary Electrophoresis- ABI 3730; Laboratory Automation (Tecan) – Operation, Scripting, and Troubleshooting; MySQL; Multiplex Ligation-dependent Probe Amplification and Peak/ Copy Number Analysis (GeneMapper and GeneMarker); Next Generation Sequencing – High Throughput/ Automated Sample Library Preparation, Sequencing (Illumina HiSeq), and Data Analysis; Nextera Sample Library Preparation; Targeted DNA/ Hybridization Capture; SOP Design and Verification.*

2013 - 2014

Millennium - Takeda International Pharmaceutical Company (Cambridge, MA)**Research Associate**

Translational Medicine Department – Biomarker Assay Laboratory Group

Responsibilities: *Biomarker Assay Development and Qualification for Pre-Clinical and Clinical Samples; COSMIC Genome Browser; Data Analysis utilizing GraphPad Prism, Microsoft Excel, Spotfire, and R; Data Reports and Presentations; DNA Extraction and Quantification/ Qualification from Whole Blood, PBMCs, Bone Marrow Aspirates, Formalin Fixed Paraffin Embedded Tissue, and Plasma; Evaluation and Qualification of Novel Genomics Technologies; Instrumentation Maintenance and Troubleshooting; Next Generation Sequencing - Sample Library Preparation, Sequencing and Analysis (Illumina MiSeq); NGS Pipeline Troubleshooting – annotation, variant calls, database references and sequence quality issues; Outsourcing Biomarker Assays; Project Management; Quantitative PCR (qPCR); Rare Mutant Enrichment and Detection; SOP Design; VCF File Review.*

2011

Broad Institute of MIT and Harvard (Cambridge, MA)**Research Associate II**

Regev Laboratory – Functional and Comparative Genomics Research Laboratory

Project: *Evaluating the evolution of drug resistance in clinical strains of *Candida albicans*.*

Responsibilities: *Data Collection and Statistical Analysis; DNA and RNA Extraction, Purification, and Quantification; Flow Cytometry (FACS); GraphPad Prism; MatLab Fundamentals Training; IGV – Integrative Genomics Viewer, Instrumentation Maintenance and Troubleshooting; Minimal Inhibitory Concentration (MIC) Assays; Next-Generation Sequencing Analysis; Polymerase Chain Reaction (PCR); PCR Primer Design for Single Nucleotide Polymorphism (SNP) Validation; Relative Fitness Assays; Sonication; SOP Design.*

2009 – 2011

University of Massachusetts Lowell (Lowell, MA)**Graduate Research**

Biological Sciences Department, Environmental Microbiology Laboratory

M.S. Thesis: *The role of soil organic matter, nutrients, and the diversity of the microbial community on the performance of microbial fuel cells.***Responsibilities:** *Aseptic Technique; Automated Ribosomal Intergenic Spacer Analysis PCR (ARISA-PCR); 16S rRNA Gene Sequencing, Alignment and Analysis; Environmental Sample Collection, Handling and Analysis; Clone Library Construction and Analysis; Data Collection and Statistical Analysis; DNA Extraction, Purification and Quantification; Experimental Protocol Design and Validation; Gel Electrophoresis; Managed the day-to-day operation and maintenance of the laboratory; Multivariate Data Analysis; PCR, Phylogenetic Analysis (ARB program, Maximum Likelihood, and 16S rRNA Gene Databases); R – Running and Editing Scripts for Data Analysis and Peak/ Sample Binning; Terminal-Restriction Fragment Length Polymorphism (T-RFLP) Analysis.*

2009

Centers for Disease Control and Prevention: National Center for Environmental Health (CCEHIP/NCEH) (Atlanta, GA)**Oak Ridge Institute for Science and Education Research Participation Program
Summer Research Fellow**

Analytical Organic Toxicology Branch, Pesticide Laboratory

Project: *Cross- comparison and validation study of analytical methods for the quantification of pesticides and herbicides in human body fluids via high-performance liquid chromatography-atmospheric pressure chemical ionization tandem mass spectrometry.***Responsibilities:** *Automation- TomTec, Data Collection and Statistical Analysis, Documentation; Chromatograph Peak Analysis and Integration (XCaliber, mass spectrometry software); High-Performance Liquid Chromatography-Atmospheric Pressure Chemical Ionization Tandem Mass Spectrometry; Linear Regression Analysis; Lyophilization; Solvent Extraction.*

2008 – 2009

University of Massachusetts Lowell (Lowell, MA)**Research Assistant**

Department of Work Environment

Project: *Evaluation of masks as a source control- nonpharmaceutical interventions against pandemic influenza.***Responsibilities:** *Aseptic Technique; Biosafety Level 2 Training; Cell Culture; Data Collection and Statistical Analysis; Fluorescence Microscopy; Focus Reduction Assay; Human Subjects Training for Biomedical Investigators (CITI); Patient Sample Collection and Analysis; Patient Intake and Screenings for Research Study; Reverse Transcription and Quantitative-PCR (Taqman); SOP Preparation and Editing; Virology Assays.*

PEER REVIEWED PUBLICATIONS:

- 2012 Sara J. Dunaj, Joseph J. Vallino, Mark E. Hines, Marcus Gay, Christine Kobyljanec and Juliette N. Rooney-Varga, 2012, Jan. "Relationships between Soil Organic Matter, Nutrients, Bacterial Community Structure, and the Performance of Microbial Fuel Cells (MFCs)", *Environmental Science and Technology*
- 2010 Jayatilaka, N. K., Montesano, A. M., Whitehead, R. D., Schloth, S. J., Needham, L. L., and Barr D. B., 2010, Sept. "High-Throughput Sample Preparation for the Quantitation of Acephate, Methamidophos, Omethoate, Dimethoate, Ethylenethiourea, and Propylenethiourea in Human Urine Using 96-Well-Plate Automated Extraction and High-Performance Liquid Chromatography-Tandem Mass Spectrometry", *Archives of Environmental Contamination and Toxicology*

GRANTS:

- 2017 **Graduate Research Grant Award:** University of Massachusetts Lowell -*\$1,300*
- 2010 **Grants in Aid of Research Program:** Sigma Xi -*\$400.00*
- 2010 **Graduate Research Grant Award:** University of Massachusetts Lowell -*\$1,300*

ACADEMIC AND PROFESSIONAL PRESENTATIONS:

- 2013 **Molecular Pathology and Translational Medicine Interdepartmental Presentation:** *Evaluation of highly sensitive targeted NGS methods to detect circulating tumor DNA in plasma. Sara Dunaj and Sunita Badola. Takeda Pharmaceuticals International Company; Cambridge, MA, USA*
- 2013 **AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics – Poster Presentation:** *Evaluation of the OnTarget™ system for highly sensitive mutation detection. Russell M. Walker, Sara Dunaj, Dalin Chan, Sunita Badola - Takeda Pharmaceuticals International Company; Cambridge, MA, USA. Hynes Convention Center- Boston, MA.*
- 2011 **Annual UMass Lowell Research Symposium - Poster Presentation:** *The Role of Soil Organic Matter, Nutrients, and the Diversity of the Microbial Community on the Performance of Microbial Fuel Cells. University of Massachusetts Lowell - Inn and Conference Center, Lowell, MA*
- 2009 **Summer Research Participation Program Presentation:** *Cross-Validation of the High-Throughput Sample Preparation Method for the Quantification of Carbamates and Organophosphates in Human Urine Using a 96-Well Plate and HPLC-MS/MS.*

Centers for Disease Control and Prevention: National Center for Environmental Health (CCEHIP/NCEH), Atlanta, GA

2009 **Annual UMass Lowell Research Symposium - Poster Presentation:** Surgical Masks Decrease the Transmission of Influenza Virus? *University of Massachusetts Lowell, MA*

PROFESSIONAL MEMBERSHIPS:

2016 – Present **American Society for Microbiology**

2010 – Present **Sigma Xi - The Scientific Research Society:** Associate Member

2006 – 2012 **American Society of Clinical Pathology**