



Sean Maden

*Bioinformatician; Quantitative Oncologist;
Computational Biology Ph.D. student*

Contact and Connect

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Education

Oregon Health and Sciences University, August 2018 - May 2021 (expected)
Department of Biomedical Engineering,
Portland, OR

Doctorate of Philosophy (Ph.D) in Computational Biology with Nellore lab and PDXgx,
dissertation on epigenetics in pan-tissue and disease analyses, emphasis on developing dynamic
server-and-database platform for normalization of experiment biases, implementation of
workflows for multi-assay analyses, and design of interfaces for universal sample- and locus-
based queries.

Reed College, September 2007 - May 2011
Portland, OR

Bachelor's of Arts (B.A.) Biology, emphasis: population genetics
Rigorous liberal arts curriculum in humanities and science; Population biology and genetics
emphasis; Thesis characterizing population declines in genetic diversity of lab cichlids (*A. burtoni*)
using microsatellite molecular markers.

Selected Research Experience

Research Data Analyst Assistant October 2015 – June 2018
Fred Hutch, Seattle, WA

Principal Investigators: Dr. William Grady, Dr. Ming Yu

Studied epigenetics of gastroesophageal cancers; Applied data processing and analytical pipelines
for arrays and next-generation technologies; Motivated inter-lab and department collaboration;
Coauthored, edited manuscripts of original research for publication; Made significant contributions
to grant writing; Conducted lectures and poster presentations at conferences; Applied R, Python,
and related statistical computing software for data mining and biostatistical analysis; Optimized
workflows and lab repositories.

Bioinformatics Research Intern April - September 2015
Fred Hutch, Seattle, WA

Principal Investigator: Dr. William Grady; Postdoc project lead: Dr. Ming Yu

Carried out original analyses of cancer epigenetic data; Self-taught analytical programming;
Presentation of findings and research discussion at lab meetings.

Laboratory Assistant January – October 2013
Principle Investigator/Advisor: Dr. Gail Jarvik
University of Washington Medical Genetics
Analyzed clinical population and epidemiologic data; Quantified gene-environment interactions with modeling and regression techniques; Programmed preprocessing workflows for next-generation genomics; Coauthored and edited published manuscript of findings (see Publications).

Undergraduate Thesis Researcher September 2010 - May 2011
Advisor: Dr. Suzy Renn
Reed College, Biology Department
Quantified effects of laboratory breeding on genetic diversity in cichlid fishes (*A. burtoni*) using microsatellites; Authored thesis studying genetic diversity of lab cichlid fishes with microsatellites, and defended thesis before professorial board; Attained department grant funding (see Research Awards).

Scientific Memberships, Fellowships, and Funding

Affiliate Member, Fred Hutch, Seattle, WA June 2018 - present
Collaborators: Grady Lab; Luebeck Lab
Affiliate Member of Fred Hutch, with ongoing affiliation and collaboration with epigenetics labs in Clinical Research and Computational Biology divisions.

AAAS Member June 2018 - present
Affiliation: OHSU Graduate School
American Association for the Advancement of Science (AAAS), student member nominated by OHSU leadership.

2016 SAS-BWF Fellow, Fred Hutch, Seattle, WA May 2016 - 2017
Advisors: Dr.'s Bill Grady and Ming Yu
Fellowship hosted and funded by SAS Institute and Burroughs Wellcome Fund. Contributed to ongoing research of epigenetics of colorectal cancer and biomarker discovery for clinical screening. Worked closely with JMP developers and recommended new software features based on real research needs.

AACR Associate Member, Fred Hutch, Seattle, WA Jan 2016 - 2017
Recognized and supported by Association for Cancer Research (AACR) as promising early-career cancer investigator. AACR is one of the largest cancer research organizations in the US, and it hosts numerous annual meetings and workshops to help cancer researchers network and learn from colleagues.

Undergraduate Research Grant, Reed College, Portland, OR Winter 2010
Advisor: Dr. Suzy Renn
Granted funding to extend research for undergraduate senior thesis studying genetic diversity of *A. burtoni* fishes (see Publications), awarded by Reed College Biology Department based on submission of original research overview.

Fischer Memorial Fellow, Reed College, Portland, OR Summer 2010
Advisor: Dr. Robert Kaplan
Designed and conducted habitat field survey experiment of native at-risk frog *Rana aurora*, constructed breeding habitat and compiled a literature review of amphibian ecology. Authored and coauthored extensive reports presented as contributions to canon of Fisher Fellows past and present.

Peer-reviewed Research Publications

1. Yuna Guo, Kelly Carter, Ming Yu, **Sean K. Maden**, Darwin Edmonds, Polly Newcomb P, Christopher Li, Neli Ulrich, William M. Grady. *Senescence associated secreted factors are candidate drivers of the age related risk of colorectal cancer*. 2018 (under peer review).
2. Georg E. Luebeck, William D. Hazelton, Kit Curtius, **Sean K. Maden**, Ming Yu, Kelly T. Carter, Wynn Burke, Paul D. Lampe, Christopher I. Li, Cornelia M. Ulrich, Polly A. Newcomb, Maria Westerhoff¹¹, Andrew M. Kaz, Yanxin Luo, John M. Inadomi, William M. Grady. *Implications of epigenetic drift in colorectal neoplasia*. 2018 Cancer Research (accepted for publication).
3. Ming Yu*, **Sean K. Maden***, Matthew Stachler*, Andrew M. Kaz, Tai J. Heinzerling, Rachele M O'Leary, Xinsen Xu, Adam Bass, Amitabh Chak, Joseph E. Willis, Sanford D. Markowitz, William M. Grady. *Subtypes of Barrett's Esophagus and Esophageal Adenocarcinoma Based on Genome-wide Methylation Analysis*. 2017, Gut. *co-first authors.
4. Ludovic Barault, Alessio Amatu, Giulia Siravegna, Agostino Ponzetti, Sebastian Moran, Andrea Cassingena, Benedetta Mussolin, Chiara Falcomatà, Alexandra Binder, Carmen Cristiano, Daniele Oddo, Carlotta Cancelliere, Sara Bustreo, Katia Bencardino, **Sean Maden**, Alice Vanzati, Patrizia Zavattari, Mauro Truini, William M. Grady, Patrizia Racca, Karin B. Michels, Salvatore Siena, Manel Esteller, Alberto Bardelli, Andrea Sartore-Bianchi, Federica Di Nicolantonio. *Discovery of methylated circulating DNA biomarkers for comprehensive non-invasive monitoring of treatment response in metastatic colorectal cancer*. 2017 Gut; PMID: PMC5897187.
5. Georg E. Luebeck, Kit Curtius, William D Hazelton, **Sean Maden**, Ming Yu, Prashanthi N Thota, Deepa T Patil, Amitabh Chak, Joseph E Willis, William M Grady. *Identification of a key role of widespread epigenetic drift in Barrett's esophagus and esophageal adenocarcinoma*. 2017 Clinical Epigenetics; PMID: PMC5644061.
6. (**Acknowledgement**) Kit Curtius, Chao-Jen Wong, William D. Hazelton, Andrew M. Kaz, Amitabh Chak, Joseph E. Willis, William M. Grady, Georg E. Luebeck. *A Molecular Clock Infers Heterogeneous Tissue Age Among Patients with Barrett's Esophagus*. May 11, 2016 PLoS Comput Bio.; PMID: 27168458
7. Daniel Seung Kim, **Sean K. Maden**, Amber A Burt, Jane E Ranchalis, Clement E Furlong and Gail P Jarvik. *Dietary fatty acid intake is associated with paraoxonase 1 activity in a cohort-based analysis of 1,548 subjects*. 2013 Lipids in Health and Disease; PMID: PMC3878825.
8. **Sean Maden**, Advisor: Suzy P Renn. *Observed Declines in Genetic Diversity Across Successive Generations of a Captive Astatotilapia burtoni Lineage, Using Microsatellite Molecular Markers*. Senior Thesis, 2011 Reed College.

Scientific Lay Press Works

1. (**Acknowledgement**) Anne-Sophie Kuhlman. "Esophageal adenocarcinoma: when DNA methylation informs the treatment". Fred Hutch Science Spotlight July 16, 2018.

Selected Bioinformatics Skills and Interests

R, JMP, STATA, statistical software;
Bioconductor/Bioc;
Tibbles, tidyverse, dply, Rstudio;
R modules, ggplot2, Gviz;
R-shiny apps, reactive programming;
GitHub, version control;
Python and shell scripting;
Windows and nix interfaces;
Compute clusters/kernels;
Parallel programming/computing;
Amazon Web Services (AWS);
Cloud optimization;
TCGA, GEO, and GDAC repos;
PostgreSQL clinical records db;
SQL queries;
Sweave, knitr, LaTeX typesetting;
Statistical modeling and regression;
Machine learning, automation;

SVM, elastic net, glmnet;
ROC/AUC and predictive analyses;
Biomarker discovery;
Next-generation sequencing;
Methylation array data mining;
Gene network analysis;
Epigenetic regulation of expression;
Medical and genomic informatics;
Biomedical data science;
Gene Ontology/KEGG enrichment;
Hi-C and TAD 3d assays;
Comparative epigenetics;
ChIP-seq, enhancer activity;
Super-enhancers, ROSE algorithm;
VELs/Disease histone activation;
Metadata mining and cleaning;
Structured ontologies;
Controlled vocabulary databases

Selected Science Presentations

1. (poster) Erik J. Snider, E. Georg Luebeck, Ming Yu, Kelly T. Carter, Sean K. Maden, Amitabh Chak, Joseph E. Willis, John M. Inadomi, Michael D. Saunders, Adam W. Templeton, William M. Grady. *Medication effects on methylation-related biological aging in Barrett's esophagus*. 2018. Abstract submitted for Digestive Disease Week 2019 conference.
2. (lecture) Sean Maden. "Recount Methylation: A generalizable platform for re-analysis of array-based epigenetic data". Biophysics Journal Club meeting, October 2018.
3. (poster) Mitra Barahimi, **Sean Maden**, Ming Yu, Kelly Carter, William Grady. *Discovery and Validation of Potential Field Cancerization Molecular Markers That Associate With Metachronous Polyp Formation*. Presented at 2018 Digestive Disease Week.
4. (lecture) **Sean Maden**. *Identification of Novel Molecular Characteristics of Methylation Subtypes in Esophageal Adenocarcinoma by Integrated Analysis*. Cancer Epigenetics Affinity Group meeting. Fred Hutch campus. Nov. 7, 2017.
5. (poster) **Sean Maden*** and Georg Luebeck*, Kit Curtius, William Hazelton, Ming Yu, Prashanti Thota, Deepa Patil, Amitabh Chak, Joseph Willis, William Grady *co-first authors. *Scope and Significance of Epigenetic Drift in Barrett's Esophagus*. Cancer Systems Biology Consortium (CSBC) Principal Investigator Meeting, Broad Institute MIT, Cambridge, MA. Oct 3, 2017.
6. (lecture) **Sean Maden**. *Spatial and temporal epigenetic pattern gradients differentiate normal and progressed tissues in esophagus*. Cancer Intervention and Surveillance Modeling Network (CISNET) 2017 meeting, Esophageal Cancer projects, June 6, 2017.
7. (poster) **Sean Maden***, Ming Yu*, Matthew Stachler*, Andrew M. Kaz, Tai J. Heinzerling, Rachele M O'Leary, Xinsen Xu, Adam Bass, Amitabh Chak, Joseph E. Willis, Sanford D. Markowitz, William M. Grady (*co-first authors). *Genome-wide methylation analysis reveals methylator subtypes of Barrett's esophagus and esophageal adenocarcinoma*. 2016 AACR Annual Meeting, Abstract: #3192, Session: DNA Methylation 1.

Graduate Science Courses Completed

Oregon Health and Science University, Ph.D. Computational Biology, Biomedical Engineering
Summer 2018 – Spring 2021 (expected)

BMI 550/650: Bioinformatics and
Computational Biology I: Algorithms
CS 545: Machine Learning

CONJ 650: Practice and Ethics of Science
BME 601: Prequalifying Phd Research

University of Washington, M.Sc. Genetic Epidemiology, Public Health Genetics
Fall 2012 - Fall 2013 (no degree obtained)

PHG 536: Bioinformatics and
Sequence Analysis
BIOSTAT 517/518: Applied
Biostatistics I and II
EPI 512/513: Epidemiological
Methods I and II
PHG 512: Law and Ethics in Public
Health Genetics

PHG 513: Pharmacogenetics and
Toxicogenomics
BIOST 580: Biostatistics Seminar
EPI 583: Epidemiology Seminar
GENOME 525: Topics in Human Genetics
PHG 511: Genetic Epidemiology
PHG 521: Culture and Societal Genomics
PHG 523: Genetics and the Law

Undergraduate Science Courses Completed

Shoreline Community College, Biotechnology Lab Specialist Certificate
Fall 2014 - Winter 2015 (no degree obtained)

BIOL 270: Molecular Biology
BIOL 285: Basics of Bioinformatics
BIOL 286: Molecular Diagnostics

BIOL 265/266: Solution and Media
Prep I and II
BIOL 275: Recombinant DNA

Reed College, B.A. Biology, Fall 2007 - Spring 2011

MATH 111: Calculus
MATH 112: Intro to Analysis
PHYS 100: General Physics I
HIST 315: Medieval/Renaissance
Science and Religion
BIOL 332: Vascular Plant Diversity
BIOL 101/102: Introductory Biology
CHEM 101/102: Introductory
Chemistry
BIOL 361: Genetics
BIOL 431: Seminar: Ecology and
Evolution of Plant-Human
Interactions

BIOL 358: Microbiology
BIOL 366: Population Ecology and
Evolution
CHEM 201/202: Organic Chemistry I
and II
PHIL 201: Logic
BIOL 351: Developmental Biology
(lecture only)
BIOL 431: Seminar: Chromosome
Structure
PHIL 316: Philosophy of Science
BIOL 431: Seminar: Gene
Duplication/Overexpression

Find Sean Online

<u>Website (topics)</u>	<u>URL Address</u>
GitHub (programming and bioinformatics):.....	https://github.com/metamaden
Personal Site and Blog (programming and data science):,.....	https://metamaden.github.io/
ResearchGate (bioinformatics):.....	https://www.researchgate.net/profile/Sean_Maden3
LinkedIn (professional profile):.....	linkedin.com/in/sean-maden-41623640
Twitter (bioinformatics and science news):.....	https://twitter.com/MadenSean