# George I. Mias
*Curriculum Vitae*

Chief, Systems Biology Division, Institute for Quantitative Health Science and Engineering,
Associate Professor,Department of Biochemistry and Molecular Biology,
Adjunct Professor, Department of Physics and Astronomy,
Adjunct Professor, Department of Pediatrics and Human Development,
Michigan State University

## 1. EDUCATION

▸ **Yale University**, New Haven, CT 06520
- Ph.D. in Physics, 2007 (4.0)
- M. Phil. in Physics, 2003
- B.S. & M.S. in Physics, 1997-2001 (3.81, *Magna Cum Laude with Distinction in Physics*)

## 2. EMPLOYMENT

▸ **Michigan State University**, East Lansing, MI 48924
- *2020 - Present* — Associate Professor, Department of Biochemistry and Molecular Biology
  Department of Physics and Astronomy (Adjunct Professor),
  Department of Pediatrics and Human Development (Adjunct Professor)
- *2016 - Present* — Chief, Systems Biology Division, Institute for Quantitative Health Science and Engineering (IQHSE)
- *2014 - 2020* — Assistant Professor, Department of Biochemistry and Molecular Biology,
  Department of Physics and Astronomy (Adjunct),
  Department of Pediatrics and Human Development (Adjunct),

▸ **Stanford University**, Stanford, CA 94305
- *2009 - 2014* — Post Doctoral Scholar, Snyder Laboratory, Department of Genetics

▸ **Yale University**, New Haven, CT 06520
- *2008 - 2009* — Lecturer/Assistant in Instruction Physics, Physics Department
- *2008 - 2009* — Math and Science Tutor, Yale College
- *Summer 2008* — Summer Instructor, Yale Summer School
- *2001 - 2007* — Graduate Research Assistant, Yale Physics Department
- *Summer 2001* — Summer Instructor, Yale Summer School

▸ **Other Professional Activities**
- *2018 - Present* — Consulting for Colgate-Palmolive North America

## 3. PERSONAL STATEMENT

My research interests lie in systems medicine and dynamics. I lead an interdisciplinary team that focuses on the application of longitudinal monitoring to evaluate and interpret microscopic molecular signatures (omics) and macroscopic physiological measurements, and integrate these to identify collective temporal trends that reflect the physiological state of a person. **Our long-term vision is to bring longitudinal individualized medicine to the clinic for all, automate the dynamic monitoring and evaluation of active personnel (astronauts), and improve diagnostics in populations with restricted access to healthcare.** To achieve these goals, we build novel integrative analysis frameworks, and software, for multi-omics dynamic data,

necessary in the analysis of biological and health Big Data and classifying disease dynamics. We investigate experimentally multi-omics integration for monitoring individuals, focusing on non-invasive saliva diagnostics in clinical trials. Finally, we study the effects of age across a range of disorders. Our research can be broadly classified in three categories:

I.    Computational Methods for studying the dynamics of multiple omics for systems medicine.
II.   Active health monitoring of physiological states and disease response - including non-invasive saliva profiling, vaccination responses and cellular drug treatments.
III.  Dynamics of aging, and associated respiratory and degenerative disorders.

At MSU we have built novel frameworks for multi-omics dynamic data and we are continuing to lead the emerging field of dynamic integrative omics and applications to precision health. My interdisciplinary team carries out innovative research including the detection of adverse events in astronauts on long duration missions, monitoring in immune related disorders and vaccinations, utilizing saliva for non-invasive diagnostics, and studying the dynamics of aging, and associated respiratory and degenerative disorders.

## 4.  HONORS, AWARDS AND SCHOLARSHIPS

‣ Jean P. Schultz Endowed Biomedical Research Fund Faculty Awardee, MSU (2017)
‣ NIH Pathway to Independence (PI) award, Career development award funded by [National Human Genome Research Institute (NHGRI)](), [K99/R00 (2013 - 2017),]()
‣ Stanford Genome Training Program Fellowship (2010-2011)
‣ J.W. Gibbs Fellowship (2001-2003)
‣ DeForest Pioneers Award for Distinguished Creative Achievement in Physics (May 2001)
‣ Phi Beta Kappa (elected member in the Fall 2000)
‣ Yale Physics Department's Nominee for American Physical Society LeRoy Apker Award (2000)
‣ Financial support provided in part by (Yale University, New Haven, CT 06520):
  • *2001 - 2003*  — John Sloane Fellowship
  • *2000 - 2001*  — Wellemeyer Scholarship
  • *1999 - 2000*  — George W. Darr Memorial Scholarship
  • *1999 - 2000*  — Wellemeyer Scholarship
  • *1998 - 1999*  — Henry M. Nodelman Scholarship
  • *1998 - 1999*  — Wellemeyer Scholarship

## MEDIA COVERAGE

• Building a better flu shot, MSU Today, Nov. 26 2019 and Jan 7 2020.
  ▪ [https://msutoday.msu.edu/news/2020/with-already-2900-people-dead-from-the-flu-we-need-a-better-vaccine/]()
  ▪ [https://www.wlns.com/news/local-news/msu-researchers-are-building-a-better-flu-shot/]()
• Developing a Precision Medicine Algorithm for Use During Space Exploration, MD News July 1 2019 [https://mdnews.com/developing-precision-medicine-algorithm-use-during-space-exploration]()
• Keeping Astronauts Healthy During Deep Space Missions, MSU Today, Jan 18, 2019 and Eureka Alert, Jan 22, 2019
  ▪ [https://msutoday.msu.edu/news/2019/keeping-astronauts-healthy-during-deep-space-missions/]()
  ▪ [https://www.eurekalert.org/pub_releases/2019-01/msu-kah012119.php]()
• Astronauts on Mars? MSU professor helps NASA plan to keep them healthy. Detroit Free Press, Dec 28, 2018 [https://www.freep.com/story/news/local/michigan/2018/12/28/healthy-astronauts-mars-msu-professor-nasa/2365643002/]()

## 5.  RESEARCH

## RESEARCH SUPPORT

‣ **Active**

- Project Number T0412          **George I. Mias** (PI)          1/1/2019-12/31/2020
  *Title:* Integrative Personalized Omics Profiling Next Steps: Detection and Classification of Deviations from Wellness
  *Funding Agency:* Translational Research Institute for Space Health, under NASA Cooperative Agreement NNX16AO69A
  *Role:* **Principal Investigator**                    *Total Costs:* $518,765
  The goals of this project are to (i) generate new computational methodology to establish the baseline healthy characteristics in individual astronauts, and detect baseline deviations that predict the onset of any adverse medical event in deep space flights. (ii) Classify departures from individualized wellness according to collective biological/physiological signal characteristics and behavior.

‣ **Completed**

- Jean P. Schultz Endowed Biomedical Research Fund, **George I. Mias** (PI)     2017 - 2018
- 1 R00 HG007065-03          **George I. Mias** (PI)          03/15/14 - 02/28/17
  *Title:* Integrative Dynamic Omics Profiling: A First Step Towards Personalized Medicine Pathway to Independence Award (R00)
  *Funding Agency:* NHGRI
  *Role:* **Principal Investigator**                    Total Costs: $745,330
- 1 K99 HG007065-01          **George I. Mias** (PI)          03/14/13 - 02/28/14
  *Title:* Integrative Dynamic Omics Profiling: A First Step Towards Personalized Medicine Pathway to Independence Award (K99)
  Funding Agency: NHGRI                    *Total Costs*: $90,000
  *Role:* **Principal Investigator**
- 5 T32 HG000044-14          Michael  Snyder (PI)          01/01/11 - 09/30/11
  Institutional Training Grant in Genome Science (Stanford University)
  This Grant supports the Stanford Genome Training Program (SGTP)
  *Role:* **Trainee**
- 5 T32 HG000044-13          Arend Sidow (PI)          01/01/10 - 12/31/10
  Institutional Training Grant in Genome Science (Stanford University)  This  Grant  supports the Stanford Genome Training Program (SGTP)
  *Role:* **Trainee**

## RESEARCH ACTIVITIES

‣ **G. Mias Lab**, Department of Biochemistry and Molecular Biology; Institute for Quantitative Health Science and Engineering, Michigan State  University, East Lansing, MI 48824 http://georgemias.org

- *2014 - Present*— Adverse event detection in astronauts on deep space missions
  - — Personalized medicine applications to immunologic disorders
  - — Integrative omics analysis of drug effects in cells
  - — Transcriptomics/proteomics/metabolomics (asthma/leukemia)
  - — Aging and disease
  - — Dynamic network analysis
  - — Complex systems and critical phenomena
  - — Sequencing: Statistical noise characterization of genomic sequences and homology, new mapping methodology and quality control

— Networks: Statistical network inference from dynamical omics data; topology and transition characterization in dynamic networks.
— Computational tools/frameworks for omics integration ([mathiomica.org](mathiomica.org))
— Two Clinical Trials Protocol Director, Active: *Vaccination responses in younger and older adults* ([clinicaltrials.gov](clinicaltrials.gov))
— Protocol Director (IRB# 15-071, Active), *Pilot for evaluation of individuals for personalized medicine*

‣ **Department of Genetics**, Stanford University, Stanford, CA 94305
  *Advisor:* Professor Michael P. Snyder
- *2009 - 2014* — Integrated Personal Omics Profiling (iPOP): Framework for analysis of dynamical omics data. Parallel analysis of transcriptome, proteome, metabolome and autoantibodyome and temporal integration. Variant detection in RNA and Protein. Applications to personalized medicine.
 — Transcriptomics: Differential analysis of RNA-Seq data, quality control (concordant twin investigations; Asthma; hematopoietic stem cell differentiation).
 — Proteomics: Framework for simultaneously identifying all protein-protein interactions in a cell.
 — Metabolomics: Analysis of time series for mouse microbiome development.
 — Protein Arrays: Detection of dynamical immune response in Myelodysplastic Syndromes, Multiple Sclerosis, Myeloma, Asthma and Rheumatoid Arthritis.
 — Participated in multiple clinical trials and wrote study protocols for asthma, leukemia and personalized health care
 — Sequencing: Statistical characterization of genomic sequences and homology.
 — Networks: Statistical network inference from dynamical omics data; topology and transition characterization.

‣ **Theoretical Physics**, Department of Physics, Yale University, New Haven, CT 06520
  Ph.D. Dissertation Title*: Domains of Quantum Magnetism* (2007)
  *Advisor:* Professor Steven M. Girvin
- *2006 - 2007* — Developed a theory for the time evolution of Bose-Einstein spinor condensates and subsequent domain formation using field theoretical techniques and a Lie algebra formalism to successfully explain experiments in $^{87}$Rb.
- *2005 - 2006* — Investigated Ferromagnetism in quantum Hall bilayer systems by performing analytical field-theoretical calculations using a topological spinor Berry-phase/path-integral formalism.
- *2004 - 2005* — Performed analytic renormalization group calculations using smooth cutoffs in modified sine-Gordon models to investigate classical and quantum roughening, additionally modeling the effect of dipolar interactions as motivated by experiments in $LiHoF_4$.
- *2002 - 2003* — Developed a field-theoretical soliton model of domain walls motivated by research in quantum magnetism and quantum phase transitions in $LiHoF_4$ and investigated the duality relationships between this model and known statistical models.

‣ **Wright Nuclear Structure Lab (WNSL),** Yale University, New Haven, CT 06520

Undergraduate Thesis Title: *Nuclear Structure: Differences in $R_{4/2}$ Ratios in Isotones and Isotopes*, (2000) - Nominated for APS Leroy Apker Award

*Advisor:* Professor Richard F. Casten

- *1999 - 2000* — Performed shell-model calculations and computational nuclear structure research to model collective behavior in nuclei and classify trends in magic nuclei.

  *Advisors:* Dr. Victor Zamfir and Professor Richard F. Casten

- *Summer 2000*— Performed angular-correlations perturbation experiments, developing detection techniques for a moving tape collector and set up cryogenic magnet cooling apparatus.

  *Advisor:* Professor Alex Wolf

- *Summer 1999*— Investigated gamma rays in 4π-Ge detectors (GRETA-Gamma Ray Energy Tracking Array) by developing an algorithm to identify and track positron-electron annihilation events in the detector, simulating the array using GEANT/Mathematica.

  *Advisor:* Professor Cornelius Beausang

- *Summer 1998*— Developed accelerator techniques and vacuum technology, upgraded a linear accelerator and performed beam optimization experiments.

  *Advisor:* Professor Richard Hyder

## PUBLICATIONS (*Online Profiles***:** NCBI Bibliography • ORCiD**)**

‣ **Monographs/Books**

1. **George I. Mias** *Mathematica for Bioinformatics: a Wolfram Language approach to Omics,* Springer (2018), ISBN 978-3-319-72377-8 DOI: 10.1007/978-3-319-72377-8

‣ **Refereed Journals**

*\*contributed equally*

*§corresponding author*

### In Preparation

- Shuyue Xue, Lavida Rogers, Minzhang Zheng, Jin He, Carlos Piermarocchi, **George I. Mias§**, *Characterization of Treatment Perturbation Using Gene Expression Networks* (in preparation).

- Minzhang Zheng, Sergii Domanskyi, Carlos Piermarocchi, **George I. Mias§**, *Time Series Categorization using Visibility Graphs* (in preparation).

- Minzhang Zheng, Carlos Piermarocchi, **George I. Mias§**, Categorization of Adverse Events in Space Health(in preparation).

### In Review/Revision

2. Y. Gao, N. Duque-Wilckens, M.B. Aljazi, Y. Wu, A.J. Moeser, **George I Mias**, A.J. Robison, J. He, *Loss of histone methyltransferase ASH1L in developing brains causes autistic-like behaviors in a mouse model.* (in Review, 2020 bioRxiv, DOI: 10.1101/2020.11.16.377259)

3. Minzhang Zheng, Sergii Domanskyi, Carlos Piermarocchi, **George I. Mias§**, *Visibility Graph Based Community Detection for Biological Time Series* (in Review, 2020, bioRxiv, DOI: doi.org/10.1101/2020.03.02.973263).

### Published

4. **George I. Mias\*§**, V..V. Singh\*, L.R.K. Brooks\*, S. Xue, S. Domanskyi, C. Piermarocchi, M. Kanada, J. He, *Longitudinal Saliva Omics Responses to Immune Perturbation: A Case Study,* Scientific Reports, 11, 710 (2021), DOI: 10.1038/s41598-020-80605-6.

5. G. de los Campos, T. Pook, A. Gonzalez-Raymnuo, H. Simianer, **George Mias,** A. I. Vazquez, *Analysis of variance with multi-layered data when both input and output sets are*

*high-dimensional,* PLoS ONE 15(12), e0243251 (2020), DOI:10.1371/journal.pone.0243251.

6. M. B. Aljazi, Y. Gao, Y. Wu, **George I. Mias**, J. He *FGF/MAPK signaling pathway regulates the genome-wide occupancy of Polycomb Repressive Complex 2 in murine embryonic stem cells* iScience, 23(11), 10164 (2020), DOI: 10.1016/j.isci.2020.101646

7. E. Veziroglu, **George I. Mias**§ *Characterizing Extracellular Vesicles and Their Diverse RNA Contents,* Frontiers in Genetics, 11: 700 (2020), DOI: 10.3389/fgene.2020.00700

8. **George I. Mias**§, M. Zheng, *The MathIOmica Toolbox: General Analysis Utilities for Dynamic Omics Datasets*, Current Protocols in Bioinformatics, 69, e91 (2020) DOI: 10.1002/cpbi.91 **Cover Article**

9. S. Domanskyi, C. Piermarocchi, **George I. Mias**§, *PyIOmica: Longitudinal Omics Analysis and Trend Identification*, Bioinformatics, 36(7): 2306 (2020), DOI:10.1093/bioinformatics/btz896

10. L. R. K Rogers, M. Verlinde, **George I. Mias**§ *Gene Expression Microarray Public Dataset Reanalysis in Chronic Obstructive Pulmonary Disease,* PLoS ONE 14(11): e0224750 (2019) DOI: 10.1371/journal.pone.0224750

11. L. R. K. Rogers, G. de los Campos, **George I. Mias**§ *Microarray Gene Expression Dataset Re-Analysis Reveals Variability in Influenza Infection and Vaccination.* Frontiers in Immunology 10:2616 (2019). DOI: 10.3389/fimmu.2019.02616

12. R. Roushangar, **George I. Mias**§ *Multi-study reanalysis of 2213 acute myeloid leukemia patients reveals age- and sex-dependent gene expression signatures* Scientific Reports 9, 12413 (2019) , DOI:10.1038/s41598-019-48872-0

13. L.R.K, Brooks, **George I. Mias**§ *Data-Driven Analysis of Age, Sex, and Tissue Effects on Gene Expression Variability in Alzheimer's Disease,* Frontiers in Neuroscience 13:392 (2019), DOI: 10.3389/fnins.2019.00392

14. L.R.K. Brooks, **George I. Mias**§, *Streptococcus pneumoniae's Virulence and Host Immunity: Aging, Diagnostics, and Prevention,* Frontiers in Immunology 9:1366 (2018), DOI:10.3389/fimmu.2018.01366

15. H. Im, V. Rao, K. Sridhar, T. Mishra, R. Chen, J. Hall, Y. Zhang, L. Xiao, **George I. Mias**, M, P. Snyder, P.L. Greenberg *Distinctive Transcriptomic and Exomic Abnormalities within Myelodysplastic Syndrome Marrow Cells,* Leukemia and Lymphoma (2018), DOI: 10.1080/10428194.2018.1452210

16. R. Roushangar and **George I. Mias**§, *MathIOmica-MSViewer: A Dynamic Viewer for Mass Spectrometry Files for Mathematica,* Journal of Mass Spectrometry, 52: 315–318, (2017) , DOI: 10.1002/jms.3928

17. **George I. Mias**§, T. Yusufaly, L. Brooks, R. Roushangar, V. Singh, C. Christou, *MathIOmica: an integrative platform for dynamic omics,* Scientific Reports 6 37237 (2016), DOI: 10.1038/srep37237

18. A. Marcobal, T. Yusufaly, S. Higginbottom, M. Snyder, J.L. Sonnenburg§, **George I. Mias**§, *Metabolome progression during early gut microbial colonization of gnotobiotic mice,* Scientific Reports 5, 11589; (2015), DOI: 10.1038/srep11589

19. M. Snyder, **George I. Mias**, L.I. Stanberry, E. Kolker, *Metadata checklist for the integrated personal omics study: proteomics and metabolomics experiments,* OMICS: A Journal of Integrative Biology, 18(1): 81-85, (2014), DOI: 10.1089/omi.2013.0148

20. E. Kolker, V. Özdemir, L. Martens, W. Hancock, G. Anderson,…, **George I. Mias** (37/61; alphabetic order),…, G. Yandl, *Towards more transparent and reproducible omics studies through a common metadata checklist and data publications,* OMICS: A Journal of Integrative Biology,18(1):1-9 (2014), DOI: 10.1089/omi.2013.0149

21. **George I. Mias**\*, R. Chen\*, K. Sridhar, Y. Zhang, D. Sharon, L. Xiao, H. Im, M.P. Snyder, P.L. Greenberg, *Specific Plasma Autoantibody Reactivity in Myelodysplastic Syndromes* Scientific Reports 3:3311 (2013), DOI: 10.1038/srep03311

22. L.I. Stanberry, **George I. Mias**, W. Haynes, R. Higdon, M. Snyder, E. Kolker *Integrative analysis of longitudinal metabolomics data from a personal multi-omics profile,* Metabolites 3(3): 741-760 (2013), DOI: 10.3390/metabo3030741

23. R. Chen, S. Giliani, G. Lanzi, **George I. Mias**, S. Lonardi, K. Dobbs, J. Manis, H. Im, J.E. Gallagher, D.H. Phanstiel, G. Euskirchen, P. Lacroute, K. Bettinger, D. Moratto, K. Weinacht, D. Montin, E. Gallo, G. Mangili, F. Porta, L.D. Notarangelo, S. Pedretti, W. Al-Herz, W. Alfahdli, A.M. Comeau, R.S. Traister, S. Pai, G. Carella, F. Facchetti, K.C. Nadeau, M. Snyder, L.D. Notarangelo, *Whole Exome Sequencing Identifies TTC7A Mutations for Combined Immunodeficiency with Intestinal Atresia,* Journal of Allergy and Clinical Immunology 132(3): 656-664.e17 (2013), DOI: 10.1016/j.jaci.2013.06.013

24. **George I. Mias**, M. Snyder, *Personal Genomes, Quantitative Dynamic Omics and Personalized Medicine*, Quantitative Biology 1(1):71-90 (2013), DOI:10.1007/s40484-013-0005-3
     ***Featured Article - Editor Selection***
     ***Cover Story; Designed Inaugural Cover and wrote Cover Blurb***

25. S. Liu, H. Im, A. Bairoch, M. Cristofanilli, R. Chen, S.Dalton, E. Deutsch, D. Fenyo, S.Fanayan,C. Gates, P .Gaudet; M. Hincapie, S. Hanash, H. Kim, S. Jeong, E. Lundberg, **George Mias**, R. Menon, Z. Mu, E. Nice, Y. Paik, M. Ahlén, L. Wells, W. Lance, S. Wu, F. Yan, F. Zhang, Y. Zhang, M. Snyder, G. Omenn, R. Beavis, H. Ronald, W. Hancock, *A Chromosome-Centric Human Proteome Project (C-HPP) to Characterize the Sets of Proteins Encoded in Chromosome 17*, Journal of Proteome Research , 12(1):45–57 (2013), DOI: 10.1021/pr300985j PMID: 23259914

26. **George I. Mias**, M. Snyder, *Multimodal dynamic profiling of healthy and diseased states for personalized healthcare*, Clinical Pharmacology and Therapeutics 93(1):29-32 (2013), DOI: 10.1038/clpt.2012.204 PMID: 23187877

27. R. Chen*, **George I. Mias***, J. Li-Pook-Than*, L. Jiang*, H.Y.K. Lam, R. Chen, E. Miriami, K.J. Karczewski, M. Hariharan, F.E. Dewey, Y. Cheng, M.J. Clark, H. Im, L. Habegger, S. Balasubramanian, M. O'Huallachain, J.T. Dudley, S. Hillenmeyer, R. Haraksingh, D. Sharon, G. Euskirchen, P. Lacroute, K. Bettinger, A.P. Boyle, M. Kasowski, F. Grubert, S. Seki, M. Garcia, M. Whirl-Carrillo, M. Gallardo, M.A. Blasco, P.L. Greenberg, P. Snyder, T.E. Klein, R.B. Altman, A.J. Butte, E.A. Ashley, M. Gerstein, K.C. Nadeau, H. Tang, M. Snyder, *Personal Omics Profiling Reveals Dynamic Molecular and Medical Phenotypes,* Cell 148(6):1293-1307 (2012), DOI: 10.1016/j.cell.2012.02.009, PMID : 22424236
     **Featured as Genome Advance of the Month by National Human Genome Research Institute (NHGRI)**

28. **George I. Mias§**, Nigel R. Cooper and S. M. Girvin, *Quantum Noise, Scaling and Domain Formation in a Spinor BEC*, Physical Review A 77(2):023616 (2008), DOI: 10.1103/PhysRevA.77.023616

29. **George I. Mias§** and S. M. Girvin, *Absence of Domain Wall Roughening in a Transverse-Field Ising Model With Long-Range Interactions*, Physical Review B 72(6):064411 (2005), DOI: 10.1103/PhysRevB.72.064411

‣ **Additional Omics Media**

30. [Software] R. Roushangar, **George I. Mias§** *ClassificaIO: machine learning for classification graphical user interface* (2018) - DOI:10.5281/zenodo.1472979, https://pypi.org/project/ClassificaIO (software publication, preprint available at bioRxiv 240184; DOI: https://doi.org/10.1101/240184).

31. [Data Resource] LK Brooks, and **George I. Mias§** *Rituximab Treatment Timecourse on Primary B cells. (Bioproject PRJNA391743, MassIVE MSV000081169)*

32. [Data Resource] LK Brooks,and **George I. Mias§** *Integrated Transcriptomic and Proteomic Dynamics of Everolimus Treatment in B Lymphoblastoid Cells (Bioproject PRJNA391449, MassIVE MSV000081170)*

33. [Data Resource] H. Im, L. Jiang, and **George I. Mias**§ *Integrated Transcriptomic and Proteomic Dynamics of Rituximab Treatment in B Lymphoblastoid Cells. (Bioproject PRJNA350221, MassIVE MSV000080244)*

34. [Data Resource] R. Chen, J.A. Jenks, S. Lyu, S. Runyon, J. Li-Pook-Than, G. Euskirchen, P. Lacroute, **George I. Mias**§, K. Nadeau§, M. Snyder§, *An Omics View of Asthma through Discordant Monozygotic Twins* (datasets deposited to dbGap [ID: phs000886.v1.p1])

35. [Data Resource] E. Wong, **George I. Mias**, iPOP resource website at: http://snyderome.stanford.edu (2012-2014)

‣ **Selected Proceedings And Conferences**

36. **George I. Mias**§, S. Domanskyi, S. Xue, C. Piermarocchi. *Integrating longitudinal omics for detection of adverse events in deep space missions*, American Society for Human Genetics Annual Meeting, Houston, TX (2019)

37. L.R.K. Brooks, **George I. Mias**§, *Meta-analysis of gene expression variability in Alzheimer's disease.*, American Society for Human Genetics Annual Meeting, San Diego, CA (2018)

38. **George I. Mias**§, *Longitudinal individualized saliva omics profiling*, American Society for Human Genetics Annual Meeting, San Diego, CA (2018)

39. **George I. Mias**§, *Integrative Proteomics and Transcriptomics for Personalized Wellness: Using Saliva and Blood to Monitor Immune Response in Individuals*, Human Proteome Organization HUPO 17th Annual World Congress, Orlando, FL (2018)

40. **George I. Mias**§, *Multi-omics profiling for individualized precision wellness using blood and saliva*, American Society for Human Genetics Annual Meeting, Orlando, FL (2017)

41. L.R.K. Brooks, **George I. Mias**§, *Longitudinal Integrative Omics of Rituximab Treatment on Primary B Cells*, American Society for Human Genetics Annual Meeting, Orlando, FL (2017) - Reviewers' Choice Abstracts selection

42. V.V. Singh, **George I. Mias**§, *Integrative Omics Response Profiling of Drug Treatments in B Cells, The Genomics of Common Diseases*, Baltimore, MD (2016)

43. V.V. Singh, **George I. Mias**§, *Integrative Dynamic Omics of Drug Treatment Responses in B Cells, Festival of Genomics Boston*, MA (2016)

44. **George I. Mias.** *Integrating dynamic omics responses for universal personalized medicine*. J. Anim. Sci. 94:201-201, doi:10.2527/jam2016-0416 (2016)

45. **George I. Mias**§, T. Yusufaly, R. Roushangar, L. Brooks, V. Singh, *Resources For Integrative Dynamic Omics and Personalized Medicine,* Keystone Symposia on The Cancer Genome and Genomics and Personalized Medicine, Banff, Canada (2016)

46. **George I. Mias**§, H. Im, E. Mitsunaga, R. Chen R, J. Li-Pook-Than, L. Jiang, M. Snyder, *Network Inference, Integrative Dynamic Omics and Personalized Medicine*, American Society for Human Genetics 12th Annual Meeting, San Francisco, CA (2012)

47. **George I. Mias**, R. Chen, J. Li-Pook-Than, L. Jiang, H. Tang, M. Snyder *Personalized Medicine Through Integrative Dynamic Omics*, Human Proteome Organization HUPO, 11th Annual World Congress, Boston, MA (2012)

48. **George I. Mias**\*, R. Chen\*, J. Li-Pook-Than\*, L. Jiang\*, H. Lam, H. Tang, M. Snyder., *Personalized Medicine Through Integrative Dynamic Omics*, Biology of Genomes, Cold Spring Harbor Laboratory, NY (2012)

49. R. Chen\*, **George I. Mias**\*, J. Li-Pook-Than\*, L. Jiang\*, et al., *Integrative Personalized Omics Profiling Reveals Complex Molecular Phenotypes and Monitorable Medical Risks* US HUPO, San Francisco, CA (2012)

50. R. Chen\*, **George I. Mias**\*, J. Li-Pook-Than\*, L. Jiang\*, et al. *Personalized Omics Profiling Unveils Complex Molecular Phenotypes and Monitorable Medical Risks,* Keystone Symposia: Complex Traits: Genomics and Computational Approaches, Breckenridge, CO (2012)

51. **George I. Mias\***, R. Chen.\*,Y. Zhang, D. Sharon, L. Xiao, K. Sridhar, M.P. Snyder, P.L. Greenberg, *Proteomic Screening for Plasma Autoantibody Biomarkers in MDS Using Protein Microarrays*, Leukemia Research **35**, Supplement 1, S23, (2011)

52. **George I. Mias**, S. M. Girvin, *Bose-Einstein S=1 Spinor Condensates, Dynamics, Noise, Statistics and Scaling*, Bulletin of the American Physical Society (2007)

53. **George Mias,** S. Girvin, *Domain Walls and Roughening Transition Possibilities in a Transverse-field Ising Model with Long-range Interactions,* Bulletin of the American Physical Society (2005)

‣ **Internal: Yale Physics Department**, Yale University, New Haven, CT 06520

54. **George I. Mias**, *Domains of Quantum Magnetism,* Doctoral dissertation, (2007)
ISBN 978-0-549-37286-8

55. **George I. Mias**, *Nuclear Structure: Differences in $R_{4/2}$ Ratios in Isotones and Isotopes,* Undergraduate Physics Thesis (2000);

Yale University Physics Departmental Nominee for American Physical Society's LeRoy Apker Award

## ORAL PRESENTATIONS
## (excluding faculty interviews and departmental retreats)

1. *Space health and longitudinal omics: detecting potentially adverse events,* **Invited Speaker**, MSU College of Nursing, East Lansing, MI (2020)

2. *Space Health,* **Speaker,** MSU Second Annual Precision Health Symposium, East Lansing MI (2019)

3. *Omics, Individualized Medicine and Detecting Adverse Events in Deep Space Missions,* **Organizer and Speaker,** Conference on Computational Health 2019, Grand Rapids MI (2019)

4. *Longitudinal Omics for Profiling Individualized Immune Responses Using Saliva and Blood,* **Invited Speaker**, University of Alabama at Birmingham, AL (2018)

5. *Integrative Proteomics and Transcriptomics for Personalized Wellness: Using Saliva and Blood to Monitor Immune Response in Individuals*, **Promoted Speaker**, Human Proteome Organization HUPO 17th Annual World Congress, Orlando, FL (2018)

6. *Integrating Dynamic Omics for Personalized Wellness.* **Weekly Speaker***,* Biomedical Engineering Department at the Institute for Quantitative Health Science and Engineering, Michigan State University, East Lansing, MI (2018)

7. *Multiple omics profiling towards precision wellness.* **Invited Speaker** for Genomics@Wayne, Wayne State University, Detroit, MI (2017)

8. *Integration of multiple dynamic omics and individualized wellness.* **Invited Speaker***,* Department of Computational Mathematics, Science and Engineering, Michigan State University, East Lansing, MI (2017)

9. *Multi-omics profiling for individualized precision wellness using blood and saliva.* **Platform Talk,** American Society for Human Genetics Annual Meeting, Orlando, FL (2017)

10. *Integration of Multiple Dynamic Omics and Individualized Precision Health,* **Invited Speaker,** Colgate-Palmolive Company, Piscataway, NJ (2017)

11. *Precision individualized wellness: profiling immune activation of multiple 'omics in healthy and asthmatic individuals,* **Invited Speaker**, Festival of Genomics Boston, Boston, MA (2017)

12. *Integrating dynamic omics responses towards universal personalized medicine,* **Invited Speaker**, Festival of Genomics California, San Diego, CA (2016)

13. *Integrating dynamic omics responses for universal personalized medicine,* **Invited Speaker**, Grand Rounds**,** Department of Pediatrics and Human Development, Michigan State University, East Lansing (2016)

14. *Integrating dynamic omics responses for universal personalized medicine,* **Invited Plenary Speaker**, Functional Annotation of Animal Genomes (FAANG) ASAS-ISAG Joint Symposium, Salt Lake City, UT (2016)

15. *Integrating Dynamic Omics Responses for Personalized Medicine,* **Invited Speaker,** Department of Microbiology and Molecular Genetics, Michigan State University, East Lansing, MI (2016)

16. *Resources For Integrative Dynamic Omics and Personalized Medicine,* **Selected Talk**, Joint Session of the Keystone Symposia on The Cancer Genome and Genomics and Personalized Medicine, Banff, Canada (2016)

17. *Omics and Personalized Medicine,* **Invited Speaker,** University of the Virgin Islands, US Virgin Islands (2016)

18. *Systems Medicine: Dynamic Omics Integration,* **Invited Speaker**, Emerging Caribbean Scientists Program ,University of the Virgin Islands, US Virgin Islands (2016)

19. *Precision Medicine* **Organizer and Speaker** of Precision Medicine Forum, Michigan State University, East Lansing, MI (2015)

20. *First Steps Towards Personalized Medicine: Dynamic Omics Integration and MathIOmica,* **Invited Speaker**, 4th Annual Cyberinfrastructure (CI) Forum, Michigan State University, East Lansing, MI (2015)

21. *Dynamic Omics Integration: a First Step Towards Personalized Medicine,* **Invited Speaker,** CMED Foundational Sciences Seminar Series, Central Michigan University College of Medicine, Mt Pleasant, MI (2015)

22. *Dynamic Omics Integration: a First Step Towards Personalized Medicine,* **Invited Speaker,** Science at the Edge, Michigan State University, East Lansing, MI (2015)

23. *Integrating Dynamic Omics for Personalized Medicine,* **Seminar Speaker,** Department of Pediatrics and Human Development, Michigan State University, Grand Rapids, MI (2015)

24. *2016 HPC Hardware Funding,* **Invited Panelist**, Cyber-Infrastructure Days, Michigan State University, East Lansing, MI (2014)

25. *Integrative Dynamic Omics, Networks and Personalized Medicine,* **Invited Speaker**, International Chinese Statistical Association - Korean International Statistical Society Applied Statistics Symposium, Portland, OR (2014)

26. *Dynamic Omics Methods for Personalized Medicine: Quantitative Omics Integration* **Invited Speaker**, Association of Biomolecular Resource Facilities ABRF 2014 Annual Meeting, Albuquerque, NM (2014)

27. *Integrating Dynamic Omics into Personalized Medicine,* **Invited Keynote Speaker** and **Session co-chair (***Molecular Diagnostics in Pathology*) 8th European Meeting on Molecular Diagnostics, The Hague / Scheveningen, The Netherlands (2013)

28. *Integrative Dynamic Omics Profiling: First Steps Towards Personalized Medicine*, **Invited Keynote Speaker**, Systems Biology 2013 From Cells to Ecosystems, DEPI, Melbourne, Australia (2013)

29. *Integrative Personal Omics Profiling and Personalized Medicine*, **Invited Talk**, Conference on Predicting Cell Metabolism and Phenotypes, SRI International, Menlo Park, CA (2013)

30. *Multimodal dynamic profiling of healthy and diseased states for personalized healthcare*, **Invited Talk**, Molecular Medicine Tri-Conference, San Francisco, CA (2013)

31. *Personalized Medicine Through Integrative Dynamic Omics*, Talk, Human Proteome Organization HUPO 11th Annual World Congress, Boston, MA (2012)

32. *Integrative Dynamic Omics for Personalized Medicine*, **Invited Seminar**, Arizona State University Biodesign Center, Tempe, AZ (2011)

33. *Dynamical Whole Omics Profiling*, Talk at Centers of Excellence in Genomic Science – CEGS Ninth Annual Grantee Meeting, Boston, MA (2011)
34. *Exploring the Dynamics of Whole Omics Profiling*, **Invited Seminar**, Evol Genome Seminar Series - Stanford, CA (2011)
35. *Proteomic Screening for Plasma Autoantibody Biomarkers in MDS Using Protein Microarrays*, Talk, 11th International Symposium on Myelodysplastic Syndromes., Edinburgh, United Kingdom (2011)
36. *Dynamic Personal Profiles Using Omics Technologies*, **Selected Talk**, Annual Stanford Symposium for Genomics and Personalized Medicine, Stanford, CA (2011)
37. *Bose-Einstein F=1 Spinor Condensates: Quantum Dynamics, Fluctuations and Domain Formation*, **Invited Seminar**, University of Toronto, Canada (2007)
38. *Bose-Einstein S=1 Spinor Condensates, Dynamics, Noise, Statistics and Scaling,* Talk, APS March Meeting, Denver, CO (2007)
39. *Roughening Transitions of Domain Walls and Dipolar Interaction Effects,* **Invited Seminar**, PITP/Les Houches Ecole de Physique Summer School on Quantum Magnetism, Les Houches, France (2006)
40. *Domain Walls and Roughening Possibilities in a Transverse-field Ising Model with Long-range Interactions*, Talk, APS March Meeting, Los Angeles, CA (2005)
41. *Introduction to Roughening Transitions,* **Invited Seminar**, Applied Physics Monday Evening Seminar, Yale University, New Haven, CT (2005)

## PROFESSIONAL SOCIETIES

‣ International Society for Computational Biology (Member since 2015)
‣ International Chinese Statistical Association (Member since 2014)
‣ Association of Biomolecular Resource Facilities (Member since 2014)
‣ Data-Enabled Life Sciences Alliance (Member since 2013)
‣ American Society of Human Genetics (Member since 2012)
‣ Human Proteome Organization (Member since 2012)
‣ US Human Proteome Organization (Member since 2012)
‣ Apple Developer (Member since 2008)
‣ New York Academy of Sciences (Member since 2007)
‣ American Physical Society (Member since 2003)
‣ Phi Beta Kappa (Member since 2000)

## 6. TEACHING AND MENTORING

## TEACHING

‣ **Michigan State University**, East Lansing, MI 48824
- *Fall 2020* — Instructor, BS 161: *Cells and Molecules* (14 x 80min lectures)
- *Fall 2020* — Instructor, BMB 961-001: Select *Topics in Biochemistry II* (3 lectures: Systems Biology, Networks and Systems Medicine)
- *Spring 2020* — Instructor, MMG 835: *Eukaryotic Molecular Genetics* (14 x 80min lectures)
- *Spring 2019* — Instructor, MMG 835: *Eukaryotic Molecular Genetics* (14 x 80min lectures)
- *Fall 2018* — Instructor, BMB 961-3: *Topics in Biochemistry* (3 lectures: Systems Biology, Networks and Systems Medicine)
- *Spring 2018* — Instructor, MMG 835: *Eukaryotic Molecular Genetics* (14 x 80min lectures)
- *Summer 2017*— Preceptor,Genetics and Genomics Journal Club, MSU College of Human Medicine (2 x 2hr sessions)
- *Spring 2017* — Instructor, MMG 835: *Eukaryotic Molecular Genetics* (14 x 80min lectures)

- *Fall 2016*    — Instructor, BMB 961-3: *Topics in Biochemistry* (3 lectures: Systems Biology, Networks and Systems Medicine)
- *Spring 2016*  — Instructor, MMG 835: *Eukaryotic Molecular Genetics* (10 x 80min lectures)
- *Fall 2015*    — Instructor, BMB 101*: Frontiers in Biochemistry* (1 lecture: Genomics, Other Omics and Personalized Medicine).
- *Fall 2014*    — Instructor, BMB 961-3*: Topics in Biochemistry* (2 lectures: Systems Biology and Network Theory).

‣ **Yale University**, New Haven, CT 06520
- *Spring 2009*  — Academic Math/Science Tutor, Yale College Dean's Office (one on one and group tutoring in all undergraduate classes offered at Yale University in physics, introductory astronomy and all levels of calculus and linear algebra).
  — Teaching Fellow, *Physics 166b: General Physics Laboratory I* (taught section, assisted in class design).
- *Fall 2008*    — Instructor, *Physics 165a: General Physics Laboratory I* (assisted in syllabus and class design, in charge of coordinating all aspects of three sections and supervising three teaching fellows).
  — Academic Math/Science Tutor, Yale College Dean's Office.
  — Teaching Fellow, *Physics 410a: Classical Mechanics* (help sections for students).
- *Summer 2008*— Instructor, Yale College, *Physics S165a: General Physics Laboratory I* (designed class syllabus, in charge of administering the entire class, supervising one teaching fellow and two sections, also lectured one section).
  — Instructor, Yale College, *Physics S166b: General Physics Laboratory II* (designed class syllabus, in charge of administering the entire class, supervised and coordinated two sections and two teaching fellows).
- *Fall 2002*    — Teaching Fellow, *Physics 420a: Statistical Thermodynamics* (assisted in exam design, administered exams, graded assignments and held help sections).
- *Spring 2002*  — Teaching Fellow, *Physics 205b: Modern Physical Measurement I* (administered class, graded lab reports and supervised experiments).
  — Teaching Fellow, *Physics 206b: Modern Physical Measurement II* (administered class, graded lab reports and supervised different kinds of experiments).
- *Fall 2001*    — Teaching Fellow, *Physics 205a: Modern Physical Measurement I* (administered class, graded lab reports and supervised experiments).
  — Teaching Fellow, *Physics 206a: Modern Physical Measurement II.*
- *Summer 2001*— Instructor, *Physics S165: General Physics Laboratory I* (redesigned summer class syllabus, adapted version still currently in use; in charge of administering the entire class, supervising two sections with one teaching fellow and lectured one section).

## MENTORING
‣ **Michigan State University**, East Lansing, MI 28912
- **Undergraduate Students Supervised**
  - *2020-Present* —  Megha Pratapwar (Professorial Assistant)
  - *2020-Present* —  Natalie Currie (Professorial Assistant)
  - *2019-Present* —  Cameron Lochrie (Professorial Assistant)

- *2019* — Calista Busch (Professorial Assistant, Lyman Briggs)
- *2018-2020* — Michael Bennet (Professorial Assistant)
- *2018-2019* — Priyanka Bhoopathi (Professorial Assistant)
- *2018* — Kenneth Matthews (Summer Student Research Opportunities [SROP])
- *2017-Present* — Jennifer Abel (Professorial Assistant, Lyman Briggs)
- *2017-Present* — Madison Verlinde(Professorial Assistant, Lyman Briggs)
- *2017-2020* — Jayna Lenders (Professorial Assistant)
  - RISE Germany Scholarship 2018
  - Gliozzo Endowed Scholarship for Domestic and International Internships 2018
- *2016-2019* — Alisha Ungkuldee (Professorial Assistant, Lyman Briggs)
- *2016-2019* — Connor Schury (Professorial Assistant, Human Biology)
- *2016-2018* — Ashley Garvin (Genomics and Molecular Genetics)
  - MSU Fowler Fellowship – summer research 2016)
  - RISE Germany Scholarship 2016
- *2017* — Kailinn Hairston (Summer Student Research Opportunities [SROP])
- *2015-2017* — Keerthana Byreddy (Professorial Assistant, Biochemistry/Biotechnology)
- *2014-2018* — Curtis Bunger (Professorial Assistant, Human Biology)
  - MSU Fowler Fellowship – summer research 2016)
- *2014-2016* — Hannah Rice (Professorial Assistant, Fisheries and Wildlife)
- *2015-2016* — Elizabeth Deyoung (Human Biology / premed)
- *2014 2016* — Brian Gutermuth (Biochemistry and Molecular Biology /premed)
  - Lyman Briggs College Research Award (2015)
- *2014-2015* — Jessica Mizzi (Biochemistry and Molecular Biology)

- **Graduate Students Supervised**
  - *2019-Present* — Shuyue Xue
    - Physics and Astronomy PhD Program
  - *2018-2020* — Eran Veziroglu
    - Biomedical Engineering Masters Program
    - *Current Position:* Medical student at Geisel School of Medicine, Dartmouth College.
  - *2014-2019* — Lavida Rogers (neé Brooks)
    - Microbiology and Molecular Genetics PhD Program
    - *Current Position:* Assistant Professor (tenure track) Biology at the University of the Virgin Islands
    - AAGA fellowship
    - University enrichment fellowship
    - AGEP Award (2018)
    - Bertina Wentworth Scholar Award (2018)
    - Travel Award MMG (Marvis Richardson Award.) (2017)
    - Ford Application Honorary Mention (2017)
  - *2014-2018* — Raeuf Roushangar
    - Biochemistry and Molecular Biology PhD Program
    - *Current Position:* Founder and Chief Architect at MetaGentex

- Paul and Daisy Soros Fellowship for New Americans recipient (2015)
- AITCH Foundation (interview finalist)

- **Postdoctoral Scholars Supervised**
  - *2019-Present* — Minzhang Zheng
  - *2019-Present* — Sergii Domanskyi
  - *2014-2017* — Vikas V. Singh
    - *Current Position:* Postdoctoral Fellow University of Arizona
  - *2014-2016* — Tahir Yusufaly
    - *Current Position:* Postdoctoral Fellow University of California San Diego

‣ **Stanford University**, Stanford, CA 94305
  - Mentoring of three graduate students in guided research projects
  - Mentoring of one postdoctoral scholar

‣ **Yale University**, New Haven, CT 06520
  - Mentoring of eleven undergraduate students

# 7. SERVICE
## PROFESSIONAL SERVICE
‣ **Grant Review**
  - Blood Cancer UK (2020)
  - National Institutes of Health (NIH) [P01 applications] (2019-2020)
  - National Aeronautics and Space Administration (NASA), 20 Applications, USA (2017-2020)
  - Czech Science Foundation (GACR), Czech Republic (2016)
  - Swiss National Science Foundation (SNSF), Switzerland (2015, 2020)
  - Medical Research Council (MRC), UK (2014)

‣ **Journal Review** (year of first review)
  - American Journal of Respiratory and Critical Care Medicine (2020)
  - Life (2020)
  - Frontiers in Immunology (2019)
  - Oxford Bioinformatics (2018)
  - BMC Bioinformatics (2017)
  - Journal of Forensic Science (2017)
  - Cell Systems (2016)
  - PLOS ONE (2016)
  - Journal of Proteome Research (2015)
  - Molecular and Cellular Proteomics (2015)
  - Scientific Reports (2015)
  - PLOS Computational Biology (2014)

## UNIVERSITY SERVICE

‣ **Michigan State University**, East Lansing, MI 28912

- *Advisor for:*
  - iCER Scientific Advisory Board (2019-Present)
  - IQ Center faculty recruitment (2016-Present)
  - Bioinformatics Course Committee (2016)
  - Curriculum for The Department of Computational Mathematics, Science and Engineering (CMSE) computational medicine course (2015-16)
- *Biochemistry and Molecular Biology:*
  - Qualifying Exam Committee (2018-20)
  - Computers Committee (2017-20)
  - Strategic Planning Committee (2014-15)
- *Institute for Quantitative Health Science and Engineering (IQ Center):*
  - Postdoctoral Mentoring Organizer (2019-Present)
    - Organizing IQ Center Postdocs
    - Development of independent development plans for IQ postdocs
  - Strategic Planning Committee (2019)
    - Drafted Policy Documents for IQ Center governance
  - Leadership Committee (2016-Present)
    - Discuss IQ organization with other division Chiefs and Director
    - Plan IQ events
    - Provide feedback on IQ recruitment
    - Discuss budgeting, core facilities and strategic planning
  - Systems Biology Division Chief (2016-Present)
    - Inaugural Division Chief
    - Organized Division with 5 faculty members
    - Responsible for mission and strategic plan of the Division, research direction, and operations of the Division at the IQ Center
    - Represents division with external potential sponsors
- *Systems Computational Omics Group (founding member and leader) (2018-Present)*
  - Synergy and research working group, consists of multiple MSU PIs across multiple departments (20+ faculty members)
    - https://omics.natsci.msu.edu/systems-computation-omics-at-msu-overview/
  - Inaugurated annual conference series on computational omics (CoCoH 2019)
  - Monthly meetings to discuss research and also present Grant Aims and explore collaborative grant opportunities
- *Seminars/Conferences*
  - Organizer/Founder for Conference on Computational Health, Grand Rapids (2019)
  - Organizer and host for Science at the Edge weekly seminar series (2014-Present)
  - Organizer for Biochemistry and Molecular Biology Departmental Retreat (2016)
  - Organizer and co-host for Precision Medicine Forum (2015)
  - Host for Biochemistry and Molecular Biology Colloquium (2014)
- *Faculty Search Committees*
  - Chair of Pediatrics and Human Development ACF search committee (2016-19)
    - 2 faculty hired (Drs. Bin Chen (UCSF) and Jeremy Prokop (Hudson Alpha))
  - Member of CMSE search committee (2015-16)
    - 2 faculty hired (Drs. Arjun Krishnan (Princeton) and Jianrong Wang (MIT))
- *Academic Competitive Fund (ACF) Proposals (2014-15)*

- Center for Precision Pediatrics
- Maternal-Infant Center
- Computational Genomics

## 42. OTHER

## TECHNICAL EXPERIENCE

‣ **Programming:** Javascript (Typescript), Swift, Python, C, Objective-C, Fortran, PASCAL, GEANT4, LaTeX, HTML
‣ **Systems:** Mac OS X, iOS, UNIX, Linux, Windows
‣ **Applications:** Mathematica, MATLAB, Octave, R, Excel, Illustrator, Cytoscape, Pajek, MySQL

## LANGUAGES

‣ English
‣ Greek
‣ French
‣ Russian