Eliah G. Overbey, Ph.D.
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EDUCATION

Postdoc	Weill Cornell Medicine Department of Physiology and Biophysics Institute for Computational Biomedicine NASA Fellow	Apr 2021 - June 2024
Ph.D.	University of Washington Department of Genome Sciences Ph.D. in Genome Sciences Specialization in Advanced Data Science	Sept 2015 - Mar 2021
B.S.	University of California San Diego Jacobs School of Engineering B.S. in Computer Science	Sept 2011 - June 2015

PUBLICATIONS

In Revision:

1. **Overbey, Eliah G.**, Braden T. Tierney, JangKeun Kim, Kirill Grigorev, Jiwoon Park, Nadia Houerbi, Sebastian Garcia Medina "**The space omics and medical atlas (SOMA): A comprehensive data resource and biobank for astronauts**." Nature.

2. Jones, Christopher, **Eliah G. Overbey**, Jacob Lacombe, A.J. Ecker, Cem Meydan, Krista Ryon, Braden Tierney, et al. "**The SpaceX Inspiration4 Mission: in-flight biomedical research, multi-omics, cognitive, and physiological metrics from the first all-civilian orbital spaceflight**." Nature.

3. Kim, JangKeun, Braden T. Tierney, **Eliah G. Overbey**, Ezequiel Dantas, Jiwoon Park, S. Anand Narayanan, Fei Wu, et al. "**Single-cell multiome and immune profiles of the Inspiration4 crew reveal cell-type, sex, and microbiome-specific responses to spaceflight**." Nature.

4. Mason, Christopher E., James Green, Konstantinos I. Adamopoulos, Evan E. Afshin, Jordan J. Baechle, Mathias Basner, Susan M. Bailey, Josef Borg, Joseph Borg, Jared T. Broddrick, Marissa Burke, Andrés Caicedo, Verónica Castañeda, Subhamoy Chatterjee, George Church, Sylvain V. Costes, Rajeev I. Desai, Raja Dhir, Juan Esteban Diaz, Sofia M. Etlin, David Furman, J. Sebastian Garcia-Medina, Stefania Giacomello, Anjali Gupta, Amira Hassanin, Nadia Houerbi, Iris Irby, Peter Jirak, Christopher W. Jones, Khaled Y. Kamal, Brian D. Kangas, Fathi Karouia, JangKeun Kim, Joo Hyun Kim, Ashley Kleinman, John M. Lawler, Jessica A. Lee, Charles L.

Limoli, Matthew MacKay, J. Tyson McDonald, Cem Meydan, Jakub Mieczkowski, Masafumi Muratani, Deena Najjar, Mariam A. Othman, **Eliah G. Overbey**, et al. "**The Second Space Age: Omics, Platforms, and Medicine Across Orbits**". Nature.

5. Grigorev, Kirill, Theodore M. Nelson, **Eliah G. Overbey**, Nadia Houerbi, JangKeun Kim, Deena Najjar, Namita Damle, et al. "**Direct RNA sequencing of astronaut blood reveals spaceflight-associated m6A increases and hematopoietic transcriptional responses**". Nature Communications.

6. Rutter, Lindsay A., Matthew J. MacKay, Henry Cope, Nathaniel J. Szewczyk, JangKeun Kim, **Eliah G. Overbey**, Braden T. Tierney, et al. "**Protective alleles and precision healthcare in crewed spaceflight."** Nature Communications.

7. Al-Turki, Taghreed M., David G. Maranon, Christopher B. Nelson, Aidan M. Lewis, Jared J. Luxton, Lynn E. Taylor, Noelia Altina, Fei Wu, JangKeun Kim, Namita Damle, **Eliah G. Overbey**, et al. "**Telomeric RNA (TERRA) mediates telomeric DNA damage response to spaceflight and radiation exposure**". NPJ Microgravity.

8. Houerbi, Nadia, JangKeun Kim, **Eliah G. Overbey**, Richa Batra, Annalise Schweickart, Laura Patras, Serena Lucotti, et al. "**Secretome profiling captures acute changes in oxidative stress, brain homeostasis, and coagulation following short-duration spaceflight.**" Nature Communications Biology.

9. Cope, Henry, Jonas Elsborg, Samuel Demharter, J Tyson Mcdonald, Chiara Wernecke, Hari Parthasarathy, Hriday Unadkat, Mira Chatrathi, Jennifer Claudio, Sigrid Reinsch, Sara Zwart, Scott Smith, Martina Heer, Masafumi Muratani, Cem Meydan, **Eliah G. Overbey**, JangKeun Kim, Jiwoon Park, Jonathan Schisler, Christopher Mason, Nathaniel Szewczyk, Craig Willis, Amr Salam, Afshin Beheshti. "**More than a Feeling: Dermatological Changes Impacted by Spaceflight**." Nature Communications Medicine.

10. Borg, Josef, Afshin Beheshti, JangKeun Kim, Namita Damle, Cem Meydan, Masafumi Muratani, **Eliah G. Overbey**, Krista Ryon, Sara Zwart, Scott Smith, Braden Tierney, Christopher Mason, Joseph Borg. "**Spatiotemporal Expression and Control of Haemoglobin in Space.**" Nature Communications.

11. Garcia Medina, J. Sebastian, S Narayanan, Karolina Sienkiewicz, **Eliah G. Overbey**, Kirill Grigorev, Krista Ryon, Jacqueline Proszynski, et al. **"Stability Contrasts with Immune, cfDNA, mitochondrial, and telomere length changes to Short Duration Spaceflight.**" Genome Medicine.

12. Caicedo, Andrés, Verónica Castañeda, Juan Díaz, Alissen Haro-Vinueza, Jiwoon Park, JangKeun Kim Kim, **Eliah G. Overbey**, et al. "**Key Genes, Altered Pathways and Potential Treatments for Muscle Loss in Astronauts and Sarcopenic Patients.**" Nature Communications.

13. Andrea Camera, Marshall Tabetah, Verónica Castañeda, JangKeun Kim, Aman Singh, Alissen Haro-Vinueza, Ivonne Salinas, Allen Seylani, Shehbeel Arif, Saswati Das, Marcelo Mori, Anthony Carano, Lorraine Christine De Oliveira, Masafumi Muratani, Richard Barker, Victoria Zaksas, Chirag Goel, Eleni Dimokidis, Deanne Taylor, Jisu Jeong, **Eliah G. Overbey**, et al. "**Aging and putative frailty biomarkers are altered by spaceflight**." Scientific Reports.

14. Beheshti, Afshin, Vera Paar, Siyi Jiang, Angela Enriquez, JangKeun Kim, Henver Brunetta, Masafumi Muratani, Angela Kubik, Noah Allen, Elizabeth Blaber, **Eliah G. Overbey**, et al. "**Countermeasures for cardiac fibrosis in space travel: It takes more than a towel for a hitchhiker's guide to the galaxy**". NPJ Microgravity.

15. J Tyson McDonald, Lily Farmerie, Meghan Johnson, Jiwoon Park, JangKeun Kim, **Eliah G. Overbey**, Jeffrey Haltom, et al. "**So Long, and Thanks for All the Antagomirs: Space Radiation Damage Rescued by Inhibition of Key Spaceflight Associated miRNAs**". Nature Communications.

16. Begum Aydogan Mathyk, Marshall Tabetah, Rashid Karim, Victoria Zaksas, JangKeun Kim, I Anu, Masafumi Muratani, Alexia Tasoula, Ruth Singh, Yen-Kai Chen, **Eliah G. Overbey**, et al. "**Spaceflight alters insulin and estrogen signaling pathways**". Nature Communications.

In Press:

1. **Overbey, Eliah G.**, Krista Ryon, JangKeun Kim, Braden Tierney, Remi Klotz, Veronica Ortiz, Sean Mullane, et al. "**Collection of Biospecimens from the Inspiration4 Mission Establishes the Standards for the Space Omics and Medical Atlas (SOMA).**" Nature Communications.

2. Park, Jiwoon, **Eliah G. Overbey**, S. Anand Narayanan, JangKeun Kim, Braden T Tierney, Namita Damle, Deena Najjar, et al. "**Spatial multi-omics of human skin reveals KRAS and inflammatory responses to spaceflight**." Nature Communications.

3. Braden T. Tierney, JangKeun Kim, **Eliah G. Overbey**, Krista A. Ryon, Jonathan Foox, Maria Sierra, Chandrima Bhattacharya, et al. "**Viral activation and ecological restructuring characterize a microbiome axis of spaceflight-associated immune activation.**" Nature Microbiology.

Published:

1. **Overbey, Eliah G**., Saswati Das, Henry Cope, Pedro Madrigal, Zaneta Andrusivova, Solène Frapard, Rebecca Klotz, et al. "**Challenges and Considerations for Single-Cell and Spatially Resolved Transcriptomics Sample Collection during Spaceflight**." *Cell Reports Methods* 2, no. 11 (November 2022): 100325. https://doi.org/10.1016/j.crmeth.2022.100325.

2. Cahill, Thomas, Henry Cope, Joseph J. Bass, **Eliah G. Overbey**, Rachel Gilbert, Willian Abraham Da Silveira, Amber M. Paul, et al. "**Mammalian and Invertebrate Models as Complementary Tools for Gaining Mechanistic Insight on Muscle Responses to Spaceflight**." *International Journal of Molecular Sciences* 22, no. 17 (August 31, 2021): 9470. https://doi.org/10.3390/ijms22179470.

3. **Overbey, Eliah G**., Theros T Ng, Pietro Catini, Lisa M Griggs, Paul Stewart, Suzana Tkalcic, R David Hawkins, Yvonne Drechsler. "**Transcriptomes of an Array of chicken ovary, intestinal, and immune cells and tissues.**" Frontiers in Genetics, 12. https://doi.org/10.3389/fgene.2021.664424

4. **Overbey, Eliah G**., Amanda M. Saravia-Butler, Zhe Zhang, Komal S. Rathi, Homer Fogle, Willian A. Da Silveira, Richard J. Barker, et al. "**NASA GeneLab RNA-Seq Consensus Pipeline:**

Standardized Processing of Short-Read RNA-Seq Data." *iScience* 24, no. 4 (April 2021): 102361. https://doi.org/10.1016/j.isci.2021.102361.

5. **Overbey, Eliah G.**, Willian Abraham Da Silveira, Seta Stanbouly, Nina C. Nishiyama, Gina D. Roque-Torres, Michael J. Pecaut, David Carl Zawieja, et al. "**Spaceflight Influences Gene Expression, Photoreceptor Integrity, and Oxidative Stress-Related Damage in the Murine Retina**." *Scientific Reports* 9, no. 1 (September 16, 2019): 13304. https://doi.org/10.1038/s41598-019-49453-x.

6. **Overbey, Eliah G.**, Amber M. Paul, Willian A. Da Silveira, Candice G.T. Tahimic, Sigrid S. Reinsch, Nathaniel Szewczyk, Seta Stanbouly, Charles Wang, Jonathan M. Galazka, and Xiao Wen Mao. "**Mice Exposed to Combined Chronic Low-Dose Irradiation and Modeled Microgravity Develop Long-Term Neurological Sequelae**." *International Journal of Molecular Sciences* 20, no. 17 (August 22, 2019): 4094. https://doi.org/10.3390/ijms20174094.

7. Battle, Stephanie L., Naresh Doni Jayavelu, Robert N. Azad, Jennifer Hesson, Faria N. Ahmed, **Eliah G. Overbey**, Joseph A. Zoller, et al. "**Enhancer Chromatin and 3D Genome Architecture Changes from Naive to Primed Human Embryonic Stem Cell States.**" *Stem Cell Reports* 12, no. 5 (May 2019): 1129–44. https://doi.org/10.1016/j.stemcr.2019.04.004.

8. Cacchiarelli, Davide, Xiaojie Qiu, Sanjay Srivatsan, Anna Manfredi, Michael Ziller, **Eliah G. Overbey**, Antonio Grimaldi, et al. "**Aligning Single-Cell Developmental and Reprogramming Trajectories Identifies Molecular Determinants of Myogenic Reprogramming Outcome**." *Cell Systems* 7, no. 3 (September 2018): 258-268.e3. https://doi.org/10.1016/j.cels.2018.07.006.

ABSTRACTS

Oral Presentations:

International Society for Biological and Environmental Repositories (ISBER)	Biospecimens from the SpaceX Inspiration4 Mission Constitute the First Commercial Aerospace Biobank: The Cornell Aerospace Medicine Biobank (CAMbank)	Granada, Spain Oct 2023
Aerospace Medical Association (AsMA)	A Comprehensive Report of All Biospecimens and Multi-omic Measurements from the Inspiration4 Mission	New Orleans, LA May 2023
SpaceOps	The Space Omics and Medical Atlas (SOMA) and the importance of studying astronaut genomics in the New Space Age.	Dubai, UAE Mar 2023
Advances in Genome Biology and Technology (AGBT)	Spatially-resolved transcriptomics of astronaut skin biopsies reveals compartment-specific gene expression changes during the Inspiration4 Mission	Miami, FL Feb 2023

American Society for Gravitational and Space Research (ASGSR)	New Opportunities in Space Life Science Research with Commercial Space Platforms (Panelist)	Houston, TX Nov 2022
Committee on Space Research (COSPAR)	Immune Function, Telomere Length, and Multi-omic Adaptations to Spaceflight Revealed From Spatial, Single-cell, and Environmental Molecular Profiling	Athens, Greece July 2022
SXSW	Alienating Mars: Challenges of Space Colonization (Panelist)	Austin, TX Mar 2022
American Society for Gravitational and Space Research (ASGSR)	Results from the first NASA GeneLab analysis working group publication	Denver, CO Nov 2019

Poster Presentations:

NASA Human Research Program Investigator's Workshop (HRP IWS)	The Biospecimen Sampling, Omics Methodology, and Data Generation from the First All-Civilian Astronaut Mission	Galveston, TX Feb 2023
American Society for Gravitational and Space Research (ASGSR)	Single-Cell and Spatially Resolved Transcriptomic Profiles of Spaceflight-Associated Neuro-Ocular Syndrome (SANS) in Murine Eye Tissue	Washington DC Nov 2023
American Society for Gravitational and Space Research (ASGSR)	Inspiration4: The Biospecimen Sampling, Omics Methodology, and Data Generation from the first All-Civilian Astronaut Mission	Houston, TX Nov 2022
American Society for Gravitational and Space Research (ASGSR)	Spaceflight influences gene expression, photoreceptor integrity, and oxidative stress-related damage in the murine retina	Denver, CO Nov 2019
American Society for Gravitational and Space Research (ASGSR)	Mice Exposed to Combined Chronic Low-Dose Irradiation and Modeled Microgravity Develop Long-Term Neurological Sequelae	Denver, CO Nov 2019
ISS Research and Development (ISSR&D)	Bringing the Genomics Revolution to Space: Adapting Bleeding-Edge DNA Sequencing Methodology for the Oxford Nanopore MinION	Washington DC July 2017

INVITED TALKS

Spaceposium: Columbia Space Initiative	Opportunities and Experiments Using Commercial Spaceflight	New York, NY Apr 2024
FINN x humble: Future of Health Summit @ SXSW	Off Planet Healthcare: Shaping the Future of Space Medicine	Austin, TX Mar 2024
Food and Drug Administration (FDA) Headquarters	Harnessing Multi-Omic Data for Exploratory Health Insights: Lessons from the SpaceX Inspiration4 Mission	Silver Spring, MD Oct 2023
NASA Analysis Working Group Symposium	Astronaut genomics in the age of commercial spaceflight (Keynote Speaker)	Virtual Mar 2023
MIT's Beyond the Cradle	Democratizing Access to Space (Panelist)	Boston, MA Mar 2023
NASA GeneLab Summer Program for High School Students (Virtual Classroom)	How to study astronaut genomes	Virtual July 2022
Loma Linda University's Integrated Biomedical Science Seminar Series	Preliminary Data from a Multi-omic Profiling of the Inspiration4 Crew	Virtual Apr 2022
CS Genetics Headquarters	Single-Cell Sequencing and Other Preliminary Multi-omic Results from the Inspiration4 Mission	Cambridge, UK Apr 2022

TEACHING

Weill Cornell Medicine — New York, NY

Director: BioAstra Summer Research Program — June – Aug 2023

Workshop Host: Dragon-seq — July 2023

Guest Lecturer, Graduate School of Medical Sciences — Apr 2023/Apr 2022

- Class: Analysis of Next Generation Sequencing, Master's Program for Computational Biology

Workshop Host: In-Flight Experiment Preparation — Feb 2022

Cold Spring Harbor Laboratory Laurel Hollow, NY
Dec 2019

Teaching Assistant, Short Courses and Workshops Series
- Class: Computational Genomics (for graduate students, postdocs, faculty)

University of Washington Seattle, WA
Jan-Mar 2019

Teaching Assistant, Department of Genome Sciences
- Class: Computational Genomics (for PhD students)

Teaching Assistant, Department of Genome Sciences Apr-June 2018
- Class: Fundamentals of Genetics and Genomics (for undergraduate students)

University of California San Diego La Jolla, CA
Apr-June 2015

Teaching Staff, Coursera Online Course
- Class: Bioinformatics I

Head Tutor Sept 2014-Mar 2015
Tutoring Staff Dec 2012-Sept 2014
Classes:
- Intro to Computer Science and Object-Oriented Programming (Java)
- Discrete Math for Computer Science
- Computer Organization and Systems Programming

Curriculum Development Specialist June 2012-Dec 2012
- Programming Fundamentals for High School Students