

# JAMES (JAMIE) T. MORTON

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## EDUCATION

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<b>Graduate</b> 2015 - Present	University of California, San Diego, CA PhD student in Computer Science Expected Graduation Date: August 2018
<b>Graduate</b> 2014 - 2015	University of Colorado, Boulder, CO PhD student in Computer Science Integrative Quantitative Biology Program
<b>Undergraduate</b> 2010 - 2014	Miami University, Oxford, OH B.S. Computer Science (Cum Laude) B.S. Electrical Engineering (Cum Laude) B.S. Mathematics and Statistics B.S. Engineering Physics
<b>Study Abroad</b> Spring 2012	Hong Kong University of Science and Technology, Hong Kong

## HONORS

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- **NSF Graduate Fellow**, 2014 - present
- **Integrated Quantitative Biology Fellowship**, University of Colorado Boulder, 2014 - 2015
- **National Barry Goldwater Scholar**, 2013
- **Benjamin Harrison Scholar**, Miami University, 2010-2014
- **First place**, Institute of Navigation (ION) Autonomous Snowplow Competition, 2014
- **NSF REU**, Cold Spring Harbor Laboratories, Summer 2012
- **Provost Academic Achievement Award**, Miami University, 2012
- **Ohio Space Grant Scholar Award**, NASA, 2012 - 2014
- **Dean's List**, Miami University, 2010-13
- **R.L. Edwards Scholarship**, Department of Physics, Miami University, 2011, 2013
- **Mary Jeannette and Clifford Harvey Scholarship**, Department of Mathematics, Miami U., 2013
- **Mary Jean and Joseph R. Priest Scholarship**, Department of Physics, Miami University, 2012
- **President List**, Miami University, 2010-11
- **Nestle Scholar**, Computer Sci. and Software Eng. Dept, Miami University, 2011
- **Faculty Prize**, Department of Mathematics, Miami University, 2011
- **Joseph A. Culler Award**, Department of Physics, Miami University, 2010, 2011
- **NSF Travel Grant**, Coupling, Energetics, & Dynamics of Atmospheric Regions workshop, 2010
- **Wright Scholar**, Air Force Research Laboratory, Wright Patterson Air Force Base, 2009

## RESEARCH INTERESTS

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High dimensional statistics, compositional data analysis, multi-omics data fusion and machine learning techniques with applications to microbial ecology with special interests in functional genomics, microbial metabolism and microbial niche differentiation.

## PUBLICATIONS

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1. **Morton, J T**, Sanders, J., Quinn, R. A., McDonald, D., Gonzalez, A., Vázquez-Baeza, Y., Navas-Molina, J. A., Song, S. J., Metcalf, J. L., Hyde, E. R., et al. (2017a). Balance trees reveal microbial niche differentiation. *mSystems*, 2(1):e00162–16
2. **Morton, J T**, Toran, L., Edlund, A., Metcalf, J. L., Lauber, C., and Knight, R. (2017b). Uncovering the horseshoe effect in microbial analyses. *mSystems*, 2(1):e00166–16

3. Amir, A., McDonald, D., Navas-Molina, J. A., Debelius, J., **Morton, J T**, Hyde, E., Robbins-Pianka, A., and Knight, R. (2017a). Correcting for microbial blooms in fecal samples during room-temperature shipping. *mSystems*, 2(2):e00199–16
4. Amir, A., McDonald, D., Navas-Molina, J. A., Kopylova, E., **Morton, J T**, Xu, Z. Z., Kightley, E. P., Thompson, L. R., Hyde, E. R., Gonzalez, A., et al. (2017b). Deblur rapidly resolves single-nucleotide community sequence patterns. *mSystems*, 2(2):e00191–16
5. Vázquez-Baeza, Y., Gonzalez, A., Smarr, L., McDonald, D., **Morton, J T**, Navas-Molina, J. A., and Knight, R. (2017). Bringing the dynamic microbiome to life with animations. *Cell Host & Microbe*, 21(1):7–10
6. Vrbanc, A., Debelius, J. W., Jiang, L., **Morton, J T**, Dorrestein, P., and Knight, R. (2017a). An elegans (t) screen for drug-microbe interactions. *Cell Host & Microbe*, 21(5):555–556
7. Hill-Burns, E. M., Debelius, J. W., **Morton, J T.**, Wissemann, W. T., Lewis, M. R., Wallen, Z. D., Peddada, S. D., Factor, S. A., Molho, E., Zabetian, C. P., Knight, R., and Payami, H. (2017). Parkinson’s disease and parkinson’s disease medications have distinct signatures of the gut microbiome. *Movement Disorders*, 32(5):739–749
8. Hemmings, S. M., Malan-Muller, S., van den Heuvel, L. L., Demmitt, B. A., Stanislawski, M. A., Smith, D. G., Bohr, A. D., Stamper, C. E., Hyde, E. R., **Morton, J T**, et al. (2017). The microbiome in posttraumatic stress disorder and trauma-exposed controls: An exploratory study. *Psychosomatic Medicine*
9. Reber, S. O., Siebler, P. H., Donner, N. C., **Morton, J T**, Smith, D. G., Kopelman, J. M., Lowe, K. R., Wheeler, K. J., Fox, J. H., Hassell, J. E., et al. (2016). Immunization with a heat-killed preparation of the environmental bacterium mycobacterium vaccae promotes stress resilience in mice. *Proceedings of the National Academy of Sciences*, page 201600324
10. Gilbert, J. A., Quinn, R. A., Debelius, J., Xu, Z. Z., **Morton, J**, Garg, N., Jansson, J. K., Dorrestein, P. C., and Knight, R. (2016). Microbiome-wide association studies link dynamic microbial consortia to disease. *Nature*, 535(7610):94–103
11. Nellore, A., Collado-Torres, L., Jaffe, A. E., Alquicira-Hernández, J., Wilks, C., Pritt, J., **Morton, J**, Leek, J. T., and Langmead, B. (2016). Rail-rna: Scalable analysis of rna-seq splicing and coverage. *Bioinformatics*, page btw575
12. Petras, D., Nothias, L.-F., Quinn, R. A., Alexandrov, T., Bandeira, N., Bouslimani, A., Castro-Falcon, G., Chen, L., Dang, T., Floros, D. J., et al. (2016). Mass spectrometry-based visualization of molecules associated with human habitats. *Analytical Chemistry*, 88(22):10775–10784
13. Barberán, A., Dunn, R. R., Reich, B. J., Pacifici, K., Laber, E. B., Menninger, H. L., **Morton, J T.**, Henley, J. B., Leff, J. W., Miller, S. L., and Fierer, N. (2015). The ecology of microscopic life in household dust. *Proceedings of the Royal Society of London B: Biological Sciences*, 282(1814)
14. **Morton, J T**, Freed, S. D., Lee, S. W., and Friedberg, I. (2015). A large scale prediction of bacteriocin gene blocks suggests a wide functional spectrum for bacteriocins. *BMC bioinformatics*, 16(1):381
15. **Morton, J T**, Abrudan, P., Figueroa, N., Liang, C., and Karro, J. E. (2014). Scope++: Sequence classification of homopolymer emissions. *Genomics*, 104(3):157–162

## PUBLICATIONS IN REVIEW

1. Washburne, A., **Morton, J T**, Sanders, J., McDonald, D., Zhu, Q., Oliverio, AM, and Knight, R. (2017). Phylogenetic analysis of microbiome data: making sense of microbiomes in light of evolution. *Nature Microbiology*

2. McCall, L.-I., **Morton, J T**, Bernatchez, J. A., de Siqueira-Neto, J. L., Knight, R., C., D. P., and McKerrow, J. H. (2017). Molecular cartography of experimental cardiac infection by the parasite trypanosoma cruzi. *Analytical Chemistry*
3. Jiang, L., Amir, A., **Morton, J T.**, Heller, R., Arias-Castro, E., and Knight, R. (2017). Discrete false discovery rate improves identification of differentially abundant microbes. *mSystems*
4. Thompson, L. R., Sanders, J. G., McDonald, D., Ladau, J., Locey, K. J., Navas-Molina, J. A., Prill, R. J., Gibbons, S. M., Gonzalez, A., Amir, A., Tripathi, A., Song, S. J., Vazquez-Baeza, Y., Kopylova, E., **J T. Morton**, Mirarab, S., Haroon, M. F., Kosciolk, T., Xu, Z. Z., Bokulich, N. A., Humphrey, G. C., Ackermann, G., Owens, S. M., Janssen, S., Brislawn, C. J., Lefler, J., Hampton-Marcell, J., Zhu, Q., Kanbar, J., Berg-Lyons, D., Fierer, N., Shade, A., Pollard, K. S., Goodwin, K. D., Jansson, J. K., Gilbert, J. A., Knight, R., and the Earth Microbiome Project Consortium (2017). The earth microbiome project. *Nature*
5. Vazquez-Baeza, Y., Callewaert, C., Debelius, J., Hyde, E., Marotz, C., **Morton, J T.**, Swafford, A., Vrbanc, A., Dorrestein, P. C., and Knight, R. (2017). Impacts of the human gut microbiome on therapeutics. *Annual Reviews*
6. Metcalf, J. L., Song, S. J., **Morton, J T.**, Weiss, S., Seguin-Orlando, A., Joly, F., Feh, C., Taberlet, P., Coissac, E., Amir, A., Willerslev, E., Knight, R., McKenzie, V., and Orlando, L. (2017). Domestication and captivity shape the horse gut microbiome. *Scientific Reports*
7. Vrbanc, A., Taylor, B. C., Aksenov, A., Callewaert, C., Debelius, J., Gonzalez, A., McCall, L.-I., McDonald, D., Melnik, A. V., **Morton, J T.**, Navas, J., Quinn, R., Sanders, J. G., Swafford, A. D., Thompson, L. R., Tripathi, A., Vazquez-Baeza, Y., Xu, Z. Z., Zaneveld, J., Zhu, Q., Caporaso, J. G., C., D. P., and Knight, R. (2017b). Best practices for analyzing microbiomes. *Nature Reviews Microbiology*
8. Debelius, J. W., McDonald, D., Hyde, E., Ackermann, G., Aksenov, A., Chen, Y., Dorrestein, P. C., Dunn, R. R., Fahimpour, A. K., Gaffney, J., Gilbert, J. A., Gogul, G., Gonzalez, A., Green, J. L., Hugenholtz, P., Humphrey, G., Huttenhower, C., Jackson, M. A., Kelley, S. T., Knights, D., Joshua-Ladau, Leach, J., Melnik, A., Metcalf, J. L., Montassier, E., **J T. Morton**, Navas-Molina, J., Peddada, S., Pollard, K. S., Rahnavard, G., Robbins-Pianka, A., Sangwan, N., Shorenstein, J., Spector, T., Thackray, V. G., Thompson, L. R., Vazquez-Baeza, Y., Wischmeyer, P., Wolfe, E., Consortium, T. A. G., and Knight, R. (2017). American gut: an open platform for citizen-science microbiome research. *Science*
9. Quinn, R. A., Comstock, W., Zhang, T., **Morton, J T.**, Silva, R. d., Tran, A., Aksenov, A., Nothias-Scaglia, L.-F., Wangpraseurt, D., Melnik, A. V., Ackerman, G., Conrad, D., Klapper, I., Knight, R., and Dorrestein, P. C. (2017). Niche partitioning of a polymicrobial infection driven by chemical gradients. *Nature*

## PUBLICATIONS IN PREPARATION

1. Kapono, C. A., **Morton, J T.**, Bouslimani, A., Orlinsky, K., Melnik, A. V., Knaan, T. L., Garg, N., Vazquez-Baeza, Y., Alexandrov, T., Protsyuk, I., Smarr, L., Knight, R., and Dorrestein, P. C. (2017). 3d chemical tracking of a human habitat and its human and microbial occupants. *Scientific Reports*
2. Martino, C., **Morton, J T.**, Knight, R., and Zengler, K. (2017). Extrapolations across the vast unobserved microbial space with matrix completion. *mSystems*
3. Lavrinienko, A., Mappes, T., Tukalenko, E., Mousseau, T. A., Mller, A. P., Knight, R., **Morton, J T.**, Thompson, L. R., and Watts, P. C. (2017). Environmental radiation alters the gut microbiome of the bank vole myodes glareolus. *Nature*

## PRESENTATIONS

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- Morton et al. The Microbiome and Sex Differences. Sex and the Kidneys: Sex Differences in Renal Disease Workshop in Bethesda, MD (2017)
- Morton et al. Balances Reveal Microbial Niche Differentiation. CODAwork (2017)
- Morton et al. From Probabilities to Balances: An Alternative Approach. Information Theory and Applications Workshop (2016)
- Morton et al. From Probabilities to Balances: An Alternative Approach Random Processes and Time Series: Theory and Applications (2016)
- Reber et al. An immunization strategy for prevention of post-traumatic stress disorder (PTSD) promotes stress resilience in mice. University California San Diego Pediatrics Symposium (2016)
- Reber et al. Immunization with a heat-killed preparation of the environmental bacterium *Mycobacterium vaccae* promotes stress resilience in mice. DNA Day (2015)
- Morton, J., Lladser M., Knight R., Uncovering the Unknown: A New Approach in Analyzing Microbiome Data NSF Data Science Workshop, 2015
- Morton, J., Freed, S. Lee, S. Friedberg, I. Prediction of Bacteriocin Associated Operons Rocky Mountain Bioinformatics Conference, 2014
- Morton, J., Freed, S. Lee, S. Friedberg, I. A pipeline for Identifying Bacteriocin-Associated Gene Clusters. ISMB Boston, 2014
- Morton, J., Freed, S. Lee, S. Friedberg, I. Discovering the Next Antibiotic Ohio Space Grant Consortium, Cleveland OH, 2014
- Morton, J., P., Abrudan, J. Karro, C. Liang , Sequence classification of homopolymer emissions (SCOPE), Great Lakes Bioinformatics Conference, Pittsburgh, PA, 2013
- Morton, J., P., Abrudan, J. Karro, C. Liang , Sequence classification of homopolymer emissions (SCOPE), Ohio Space Grant Consortium, Cleveland OH, 2013
- Morton, J., P., Abrudan, J. Karro, C. Liang , Sequence classification of homopolymer emissions (SCOPE), IEEE 2nd International Conference on Computational Advances in Bio and Medical Sciences, ICCABS 2012, Las Vegas, NV, February 2012
- Morton, J., J. Karro, C. Liang, A novel approach for identifying poly(A) tails in raw cDNA sequence data using General Hidden Markov Models, Genome Informatics Cold Spring Harbor, NY, November 2011.

## PROFESSIONAL MEMBERSHIPS AND SERVICES

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- International Society of Computational Biology Student member, Summer 2014-Present
- Association for Computing Machinery Student member, 2011-Present
- Sigma Pi Sigma, Tau Beta Pi, Eta Kappa Nu 2014
- National Society of Collegiate Scholars, 2012 - 2013
- Institute of Electrical and Electronics Engineers Student member, 2011-2016
- IEEE Miami Student Chapter Treasurer, 2011 - 2012

## PROFESSIONAL SERVICES

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- Poster Reviewer for ISMB 2015 2014-2016

## WORKSHOPS

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- Teaching Assistant. Qiime2 workshop. Las Vegas June 21-23, 2017
- Teaching Assistant. STAMPS Woodshole, MA, August 2-13 2016

## TEACHING AND STUDENT MENTORING

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- Instructor. Qiime2 workshop. UBC Vancouver August 23-25, 2017
- Instructor. Qiime2 workshop. UBC Kelowna August 21-22, 2017

During my studies as a PhD student, I have mentored and co-authored with the following students.

- Jue Wang (undergraduate student Summer 2017)
- Cameron Martino (undergraduate student SprinAg 2017)
- Liam Toran (masters student Summer 2016)
- Kayla Orlinsky (undergraduate student Spring 2016)

## SKILLS

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### Foreign Language Skills

- Chinese – Fluent in Mandarin and competent in written Chinese

### Highly skilled in the following languages and computational platforms

- Python   • C/C++   • Java   • Javascript   •  $\text{\LaTeX}$    • ROS   • Hadoop
- Matlab   • R   • Unix   • SQL   • OpenCL   • CUDA   • git

## OPEN SOURCE CONTRIBUTIONS

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- Gneiss (Core Maintainer)
- Sci-kit Bio (Developer)
- Emperor (Developer)
- Qiime2 (Contributor)
- Deblur (Contributor)
- Micronota (Developer)
- BOA: Bacteriocin Operon Associator (Lead Developer)
- SCOPE++: Sequence Classification Of homoPolymer Emissions (Lead Developer)
- Rail-RNA (Contributor)
- Statsmodels (Contributor)
- Scipy (Contributor)
- Biopython (Contributor)

## PERSONAL INTERESTS

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- Music: piano, cello, guitar, and voice (base).
- Sports: Surfing, Scuba Diving, Ice Hockey, Skiing, Hiking, Biking, Kung Fu
- Others: Traveling, Cooking