JAMES (JAMIE) T. MORTON

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RESEARCH INTERESTS

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

EDUCATION

Graduate	University of California, San Diego, CA
2015 - Present	PhD candidate in the Department of Computer Science
	Expected Graduation Date: August 2018
	PhD Thesis:
	"Inference on High Dimensional Microbial Compositions: A Balancing Act"
Graduate	University of Colorado, Boulder, CO
2014 - 2015	PhD student in the Department of Computer Science
	Integrative Quantitative Biology Program
Undergraduate	Miami University, Oxford, OH
2010 - 2014	B.S. Computer Science (Cum Laude)
	B.S. Electrical Engineering (Cum Laude)
	B.S. Mathematics and Statistics
	B.S. Engineering Physics
Study Abroad	Hong Kong University of Science and Technology, Hong Kong
Spring 2012	

HONORS

- **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 team member**, Institute of Navigation 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 & Clifford Harvey Scholarship**, Mathematics Department, Miami U., 2013
- **Mary Jean & Joseph R. Priest Scholarship**, Physics Department, Miami U., 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

PUBLICATIONS

1. **Morton, J. T.**, Sanders, J., Quinn, R. A., McDonald, D., Gonzalez, A., Vazquez-Baeza, Y., Navas-Molina, J. A., Song, S. J., Metcalf, J. L., and Hyde, E. R. (2017). 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. (2017). Uncovering the horseshoe effect in microbial analyses. *mSystems*, 2(1):e00166–16

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

4. McCall, L.-I., **Morton, J. T.**, Bernatchez, J. A., de Siqueira-Neto, J. L., Knight, R., Dorrestein, P. C., and McKerrow, J. H. (2017). Molecular cartography of experimental cardiac infection by the parasite Trypanosoma cruzi. *Analytical Chemistry*, 89(19):10414–10421

5. 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. (In Press). Domestication and captivity shape the horse gut microbiome. *Scientific Reports*

6. Jiang, L., Amir, A., **Morton, J. T.**, Heller, R., Arias-Castro, E., and Knight, R. (In Press). Discrete false discovery rate improves identification of differentially abundant microbes. *mSystems*

7. 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., **Morton, J. T.**, Mirarab, S., Haroon, M. F., Kosciolek, 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). A communal catalogue reveals Earths multiscale microbial diversity. *Nature*

8. Vazquez-Baeza, Y., Callewaert, C., Debelius, J., Hyde, E., Marotz, C., **Morton, J. T.**, Swafford, A., Vrbanac, A., Dorrestein, P. C., and Knight, R. (2017). Impacts of the human gut microbiome on therapeutics. *Annual Reviews*, 58

9. Amir, A., McDonald, D., Navas-Molina, J. A., Debelius, J., **Morton, J. T.**, Hyde, E., Robbins-Pianka, A., and Knight, R. (2017). Correcting for microbial blooms in fecal samples during room-temperature shipping. *mSystems*, 2(2):e00199–16

10. Amir, A., McDonald, D., Navas-Molina, J. A., Kopylova, E., **Morton, J. T.**, Zhenjiang, Z. X., Kightley, E. P., Thompson, L. R., Hyde, E. R., Gonzalez, A., and Knight, R. (2017). Deblur rapidly resolves single-nucleotide community sequence patterns. *mSystems*, 2(2)

11. Vazquez-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

12. Vrbanac, A., Debelius, J. W., Jiang, L., **Morton, J. T.**, Dorrestein, P., and Knight, R. (2017). An Elegan (t) screen for drug-microbe interactions. *Cell Host & Microbe*, 21(5):555–556

13. 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

14. 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.**, Marotz, C. A., Siebler, P. H., Braspenning, Maarten Irand Van Criekinge, W., Irand Hoisington, A. J., Brenner, L. A., Postolache, T. T., McQueen, M. B., Krauter, K. S., Knight, R., Seedat, S., and Lowry, C. A. (2017). The microbiome in posttraumatic stress disorder and trauma-exposed controls: an exploratory study. *Psychosomatic Medicine*, 79(8):936–946

15. 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., Jr., J. E. H., Greenwood, B. N., Jansch, C., Lechner, A., Schmidt, D., Uschold-Schmidt, N., Fchsl, A. M., Langgartner, D., Walker, F. R., Hale, M. W., Perez, G. L., Treuren, W. V., Gonzlez, A., Halweg-Edwards, A. L., Fleshner, M., Raison, C. L., Rook, G. A., Peddada, S. D., Knight, R., , and Lowry, C. A. (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*, 113(22):201600324

16. Gilbert, J. A., Quinn, R. A., Debelius, J., Zhenjiang, Z. X., **Morton, J. T.**, 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

17. Nellore, A., Collado-Torres, L., Jaffe, A. E., Alquicira-Hernández, J., Wilks, C., Pritt, J., **Morton, J. T.**, Leek, J. T., and Langmead, B. (2016). Rail-RNA: Scalable analysis of RNA-seq splicing and coverage. *Bioinformatics*, page btw575

18. Petras, D., Nothias, L.-F., Quinn, R. A., Alexandrov, T., Bandeira, N., Bouslimani, A., Castro-Falcn, G., Chen, L., Dang, T., Floros, D. J., Hook, V., Garg, N., Hoffner, N., Jiang, Y., Kapono, C. A., Koester, I., Knight, R., Leber, C. A., Ling, T.-J., Luzzatto-Knaan, T., McCall, L.-I., McGrath, A. P., Meehan, M. J., Merritt, J. K., Mills, R. H., **Morton, J. T.**, Podvin, S., Protsyuk, I., Purdy, T., Satterfield, K., Searles, S., Shah, S., Shires, S., Steffen, D., White, M., Todoric, J., Tuttle, R., Wojnicz, A., Sapp, V., Vargas, F., Yang, J., Zhang, C., and Dorrestein, P. C. (2016). Mass spectrometry-based visualization of molecules associated with human habitats. *Analytical Chemistry*, 88(22):10775–10784. PMID: 27732780g

19. 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)

20. **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

21. **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

MANUSCRIPTS SUBMITTED FOR PUBLICATION

1. Vrbanac, 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. (Submitted, August 2017). Best practices for analyzing microbiomes. *Nature Reviews Microbiology*

2. 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., JoshuaLadau, Leach, J., Melnik, A., Metcalf, J. L., Montassier, E., **Morton, J. T.**, 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. (Submitted, August 2017). American Gut: an open platform for citizen-science microbiome research. *Science*

3. Quinn, R. A., Comstock, W., Zhang, T., **Morton, J. T.**, Silva, R. d., Tran, A., Aksenov, A., Nothias-Scaglia1, L.-F., Wangpraseurt, D., Melnik, A. V., Ackerman, G., Conrad, D., Klapper, I., Knight, R., and Dorrestein, P. C. (Submitted, August 2017). Niche partitioning of a polymicrobial infection driven By chemical gradients. *Nature*

4. Lavrinienko, A., Mappes, T., Tukalenko, E., Mousseau, T. A., Moller, A. P., Knight, R., **Morton, J. T.**, Thompson, L. R., and Watts, P. C. (Submitted, September 2017). Environmental radiation alters the gut microbiome of the bank vole Myodes glareolus. *Nature*

5. Kapono, C. A., **Morton, J. T.**, Bouslimani, A., Melnik, A. V., Orlinsky, K., Knaan, T. L., Garg, N., Vazquez-Baeza, Y., Alexandrov, T., Protsyuk, I., Smarr, L., Knight, R., and Dorrestein, P. C. (Submitted, October 2017). 3D Chemical tracking of a human habitat and its human and microbial occupants. *Scientific Reports*

6. Martino, C., **Morton, J. T.**, Knight, R., and Zengler, K. (Submitted, October 2017). Extrapolations across the vast unobserved microbial space with matrix completion. *mSystems*

MANUSCRIPTS UNDER PREPARATION

1. **Morton, J. T.**, Aksenov, A., Nothias-Scaglia, L.-F., Song, S. J., Anderson, B., Ladau, J., Vargas, F., Dorrestein, P., Knight, R., and Dutton, R. (To be submitted to *ISME*). Metabolic niche partitioning across microbial biofilms in blue cheese

2. **Morton, J. T.**, Weiss, S., Thompson, L., and Knight, R. (To be submitted to *Bioinformatics*). Classifying microbial associations using balance selection

3. **Morton, J. T.**, Silverman, J., Foulds, J., and Knight, R. (To be submitted to *Genome Biology*). Microbial niche discovery with Bayesian multinomial regression

SELECTED CONFERENCE PRESENTATIONS

- **Morton J. T.** (2017). The microbiome and sex differences. Sex and the Kidneys: Sex Differences in Renal Disease Workshop in Bethesda, MD

- **Morton, J. T.**, Sanders, J., Quinn, R. A., McDonald, D., Gonzalez, A., Vazquez-Baeza, Y., Navas-Molina, J. A., Song, S. J., Metcalf, J. L., and Hyde, E. R. (2017). Balances reveal microbial niche differentiation. CODAwork in Abbadia San Salvatore, Siena, Italy

- **Morton, J. T.**, Freed, S., Lee, S., and Friedberg, I. (2014). Prediction of Bacteriocin Associated Operons. Rocky Mountain Bioinformatics Conference, Aspen, CO

- **Morton, J. T.**, Richard, M., and Robert, C. (2013). Redblade Miami University's autonomous vehicle. Institute of Navigation (ION) Autonomous Snowplow Competition, St. Paul, MN

SELECTED POSTER PRESENTATIONS

- **Morton, J. T.**, Sanders, J., Quinn, R. A., McDonald, D., Gonzalez, A., Vazquez-Baeza, Y., Navas-Molina, J. A., Song, S. J., Metcalf, J. L., and Hyde, E. R. (2017). From probabilities to balances: an alternative approach. Information Theory and Applications Workshop in San Diego, CA

- **Morton, J. T.**, Sanders, J., Quinn, R. A., McDonald, D., Gonzalez, A., Vazquez-Baeza, Y., Navas-Molina, J. A., Song, S. J., Metcalf, J. L., and Hyde, E. R. (2017). From probabilities to balances: an alternative approach. Random Processes and Time Series: Theory and Applications in San Diego, CA

- 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., Jr., J. E. H., Greenwood, B. N., Jansch, C., Lechner, A., Schmidt, D., Uschold-Schmidt, N., Fchsl, A. M., Langgartner, D., Walker, F. R., Hale, M. W., Perez, G. L., Treuren, W. V., Gonzlez, A., Halweg-Edwards, A. L., Fleshner, M., Raison, C. L., Rook, G. A., Peddada, S. D., Knight, R., , and Lowry, C. A. (2016). An immunization strategy for prevention of post-traumatic stress disorder (PTSD) promotes stress resilience in mice. University California San Diego Pediatrics Symposium in San Diego, CA

- **Morton, J. T.**, Lladser, M., and Knight, R. (2015). Uncovering the Unknown: a new approach in analyzing microbiome data. NSF Data Science Workshop in University of Washington, Seattle, WA
- **Morton, J. T.**, Freed, S., and Lee, S. Friedberg, I. (2014). Discovering the next antibiotic. Ohio Space Grant Consortium in Cleveland, OH
- **Morton, J. T.**, Abrudan, P., Karro, J., and Liang, C. (2013). Sequence classification of homopolymer emissions (SCOPE). Great Lakes Bioinformatics Conference, Pittsburgh, PA
- **Morton, J. T.**, Abrudan, P., Karro, J., and Liang, C. (2012). Sequence classification of homopolymer emissions (SCOPE). IEEE 2nd International Conference on Computational Advances in Bio and Medical Sciences, ICCABS , Las Vegas, NV
- **Morton, J. T.**, Karro, J., and Liang, C. (2011). A novel approach for identifying poly(A) tails in raw cDNA sequence data using Hidden Markov Models. Genome Informatics in Cold Spring Harbor, NY
- Santana, J., **Morton J. T**, and Zhou, Q. (2010). A fuzzy logic approach to extract plasma line frequencies from Arecibo incoherent scatter radar measurements. Coupling, Energetics, and Dynamics of Atmospheric Regions Workshop, Boulder, CO

PROFESSIONAL MEMBERSHIPS

- International Society of Computational Biology Student member, 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 (IEEE) Student member, 2011-2016
- IEEE Miami Student Chapter Treasurer, 2011 - 2012

PROFESSIONAL SERVICES

- Poster Reviewer for ISMB 2015

TEACHING

- Instructor. Qiime2 workshop. Colorado State University, November 20-21, 2017
- Instructor. Qiime2 workshop. UBC Vancouver, August 23-25, 2017
- Instructor. Qiime2 workshop. UBC Kelowna, August 21-22, 2017
- Teaching Assistant. Qiime2 workshop. Las Vegas, NV, June 21-23, 2017
- Teaching Assistant. STAMPS, Woodshole, MA, August 2-13, 2016

MENTORING

- Andrew Nyugen, undergraduate student, Fall 2017
- Thant Htoo Zaw, undergraduate student, Fall 2017
- Kalen Cantrell, undergraduate student, Fall 2017
- Yimeng Yang, undergraduate student, Fall 2017
- Jue Wang, undergraduate student, Summer 2017
- Cameron Martino, undergraduate student, Spring 2017
- Josh Lefler, undergraduate student,Fall 2016
- Liam Toran, masters student, Summer 2016
- Kayla Orlinsky, undergraduate student, Spring 2016

SKILLS

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
- Stan
- Matlab
- R
- Unix
- SQL
- ROS
- Hadoop
- LaTeX
- OpenCL
- CUDA
- git
- Arduino

OPEN SOURCE CONTRIBUTIONS

- Gneiss (Lead Developer)
- BOA (Lead Developer)
- SCOPE(Lead Developer)
- scikit-bio (Developer)
- Emperor (Developer)
- Micronota (Developer)
- Qiime2 (Developer)
- Deblur (Developer)
- Rail-RNA (Contributor)
- Statsmodels (Contributor)
- Scipy (Contributor)
- Biopython (Contributor)

PERSONAL INTERESTS

- Music: Piano, Cello, Guitar, and Voice (base).
- Sports: Surfing, Scuba Diving, Ice Hockey, Skiing, Hiking, Biking, Kung Fu
- Others: Traveling, Cooking