Tiffany A. Timbers, Ph.D.

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# *Curriculum vitae*

## POSITIONS HELD:

- Teaching and Learning Fellow, 2016 – Current University of British Columbia, Dept. of Statistics, Vancouver, BC *Teaching, coordination and curriculum development for the professional Master of Data Science (MDS) program* Supervisors: Paul Gustafson, Giuseppe Carenini, Jenny Bryan, and Raymond Ng.
- Banting Postdoctoral Fellow, 2012 – 2016 Simon Fraser University, Dept. of Molecular Biology & Biochemistry, Burnaby, BC *Integrating genomic and phenomic data to identify novel genes critical for cilia and sensory neuron function* Supervisor: Michel R. Leroux.

## EDUCATION:

- Ph.D. in Neuroscience, 2005 – 2012 University of British Columbia, Brain Research Centre, Vancouver, BC *The roles of CREB, CaMK1 and ageing in short- and long-term tap habituation in C. elegans* Ph.D. Supervisor: Catharine H. Rankin.
- B.Sc. in Biology, with Honours, 2001-2005 Carleton University, Dept. of Biology, Ottawa, ON *Vibration-mediated spacing in gregarious caterpillars* Honors Thesis Supervisor: Jayne E. Yack.

## ADDITIONAL COURSES:

- Instructor Training, Software Carpentry, 2014
- Certificate Course in University Teaching, Simon Fraser University, 2014
- Instructional Skills Workshop, Simon Fraser University, 2014
- High-Dimensional Omics Data, Summer Institute of Statistical Genetics, Univerity of Washington, 2014
- Pathway & Network Analysis for Omics, Summer Institute of Statistical Genetics, University Washington, 2014
- Statistical Learning, Stanford University Online, 2014
- R Bootcamp, Software Carpentry, 2014

## TEACHING EXPERIENCE:

1. Instructor, University of British Columbia, Vancouver, BC Sept - Oct. 2016

   DSCI 511 - Programming for Data Science (for MDS graduate students - 22 students). Overview of data structures, iteration, flow control, and program design relevant to data exploration and analysis. When and how to exploit pre-existing libraries.

   DSCI 521 - Computing Platforms for Data Science (for MDS graduate students - 22 students). How to install, maintain, and use the data scientific software "stack". The Unix operating system, integrated development environments, and problem solving strategies.

DSCI 522 - Data Science Workflows (for MDS graduate students - 22 students). Basic principles of sound data scientific workflows. Implementing these workflows in appropriate state-of-the-art systems and languages (e.g., Python and R). Deliberate effort at organization, tool choice, and process.

2. Teaching Fellow, University of British Columbia, Vancouver, BC Sept. 2016 - present

    - Supported the instruction of the following MDS courses via course coordination, lab curriculum development and content delivery, as well as teaching assistant supervision.
        - DSCI 523 - Data Wrangling
        - DSCI 552 - Statistical Inference and Computation I
        - DSCI 531 - Data Visualization I
        - DSCI 524 - Collaborative Software Development
        - DSCI 561 - Regression I
        - DSCI 542 - Communication and Argumentation
        - DSCI 573 - Feature and Model Selection
    - Liasoned with industry, not-for-profits and academic entities to generate 5 viable MDS Capstone projects
    - Developed teaching curriculum/materials for the Applied Statistics and Data Science Group (ASDa) statistical models course taught to UBC grad students & postdocs in Feb 2017

3. Instructor, Quest University, Squamish, BC Oct. – Nov., 2015

    PHY2009 – Computation in the Physical Sciences (for BA&Sc - 13 students) Critical practices to carry out a computational project from beginning to end, including code modularization, readability and re-use, as well as version control to organize their coding projects and collaborate effectively. Ultimately, students will use these tools to analyze their own datasets in a term project. For preparation, students will work through a sample dataset from a radioactive isotope decay experiment together as a class. Skills will be taught via a combination of live- coding sessions and work-along sessions. Think of it as a guided three hour hackathon each day of the block.

4. Instructor, Michigan State University, Kellogg Biological Station Augusta, MI, Aug., 2015

    Advanced Analysis of Next-Generation Sequencing Data – Intensive one week summer course will introduce attendees with a strong biology background and an intermediate computational background to doing reproducible research using Docker, AWS Cloud Computing, version control with Git/Github and RMarkdown, as well as how to perform genome assembly, differential expression analysis, genome-wide association analysis, and RNAseq pathway analysis.

5. Mentorship Sub-committee member, Software Carpentry http://software-carpentry.org Mar. 2015 – Present

    The Software Carpentry Foundation is a non-profit organization whose instructors teach scientists and researchers basic software skills.

    - Held post-workshop debriefing for instructors
    - Developed micro-lesson training step in the Software Carpentry Instructor Certification Program
    - Organized 1st ever Software + Data Carpentry Instructor & Helper Retreat and the 1st ever Software Carpentry Bug BBQ (lesson development sprint)

6. Instructor, Software Carpentry http://software-carpentry.org Jan. 2015 – Present

    - Taught 8 interactive 2-day workshops on automating tasks using the Unix shell, structured programming in Python or R, version control using Git and relational databases (SQL).
    - Created new challenge questions to probe student learning during the workshop
    - Implemented a new pedagogical approach to teaching version control and collaboration

7. Instructor, University of British Columbia, Vancouver, BC Jan. – Apr. 2011

    PSYC 306 – Principles of Animal Behavior (for B.Sc. Psychology Majors - approx. 100 students). Theory of evolution; behavioral genetics; social systems as ecological adaptation; mating and parental strategies; instinct

and learning; evolution of human behavior.

8. Teaching Assistant, various institions and courses.
    - University of British Columbia, Vancouver, BC (2006-2011)
        - PSYC 306 – Principles of Animal Behavior
        - PSYC 363 – Principles of Animal Learning
        - PSYC 368 – Perceptual Processing
    - Marine Biological Laboratory, Woods Hole, MA (2008)
        - Neural Systems and Behavior
    - Carleton University, Ottawa, ON (2005)
        - BIOL 3802 – Animal Behavior
9. Student Supervision, 16 undergraduate student research projects
    - Planned/designed projects, trained/supervised students, graded projects.

## HONOURS & AWARDS:

| Title | Organization | Amount | Date |
|---|---|---|---|
| Banting Postdoctoral Fellowship | CIHR | $140,000 | 2015 – 2017 |
| DeLill Nasser Travel Award for Professional Development | Genetics Society of America | $1,000 | 2014 |
| Best Talk Abstract (Postdoctoral Fellow) | Simon Fraser University MBB Colloquium | $50 | 2014 |
| Alexander Graham Bell Canada Graduate Scholarship | NSERC | $105,000 | 2008 – 2011 |
| Best Oral Presentation | Cell Biology Retreat | $100 | 2007 |
| University Graduate Fellowship | University of British Columbia | $52,500 (Declined) | 2006 |
| Junior Graduate Scholarship | Michael Smith Foundation for Health Research | $43,000 | 2006 – 2008 |
| Master’s Award | CIHR | $17,500 | 2005 – 2006 |
| Best Poster Award (Ecology) | Carleton University | $75 | 2005 |
| Maxwell M MacOdrum Scholarship | Carleton University | $2,500 | 2004 – 2005 |
| Undergraduate Student Research Award | NSERC | $4,500 | 2003 |
| President’s Scholarship | Carleton University | $4,000 | 2001 – 2002 |
| Aiming for the Top Tuition Scholarship | OSAP | $3,500 | 2001 – 2002 |

## PROFESSIONAL ACTIVITIES:

- Organizer: hackseq genomics hackathon (satellite event of American Society for Human Genetics Meeting), 2016
- Workshop leader: UBC R study group, 2016
- Peer review of `ezknitr` R software package: ROpenSci, 2016

- Invited attendee: ROpenSci unconference, 2016
- Organizer: SFU Research Bazaar, 2016
- Organizer and Workshop leader: SFU Scientific Programming Study Group, 2015
- Instructor and Mentorship Sub-committee: Software Carpentry, 2014 - 2015
- Executive Member: Simon Fraser University Postdoctoral Fellow Association, 2014 - 2015
- Organizer: Canadian Association of Neuroscience Satellite Symposium, 2014 - 2015
- Organizer: UBC Graduate Program in Neuroscience Student Summer Seminar Series, 2011
- Vice-Chair: VanWoRM Organizing Committee, 2008 - 2010
- General Member: VanWoRM Organizing Committee, 2006 - 2007
- Mentor: Making Contact Mentorship Program, Vancouver School Board, 2007
- Volunteer Scientist: Lets Talk Science, University of British Columbia, 2006 - 2007

## PUBLISHED EDUCATIONAL MATERIALS:

1. Aldazabal M. et al. (2017, February). Software Carpentry: The Unix Shell. Zenodo. doi: 10.5281/zenodo.278226
2. Ahmadia, A. et al. (2017, February). Software Carpentry: Version Control with Git. Zenodo. doi: 10.5281/zenodo.278219

## PEER-REVIEWED RESEARCH PUBLICATIONS:

1. Yadav, C., Guedes, R.N.C., Matheson, S.M., Timbers, T.A., and Yack, J.E. (2017). Invitation by vibration: recruitment to feeding shelters in social caterpillars. *Behavioral Ecology and Sociobiology* 71(3):51. doi: 10.1007/s00265-017-2280-x
2. Babaian, A., Drögemöller, B., Grande, B.M., Jackman, S.D., Lee, A.H., Lin, S., Loucks, C., Suarez-Gonzalez, A., Timbers, T.A. and Wright, G. (2017). hackseq: Catalyzing collaboration between biological and computational scientists via hackathon version 1; referees: awaiting peer review. *F1000Research*, *Hackathons channel*. doi: 10.12688/f1000research.10964.1
3. Jensen, V.L., Carter, S., Sanders, A.A.W.M., Li, C., Kennedy, J., Timbers, T.A., Cai, J., Scheidel, N., Kennedy, B.N., Morin, R.D., Leroux, M.R. and Blacque, O.E. (2016). Whole-Organism Developmental Expression Profiling Identifies RAB-28 as a Novel Ciliary GTPase Associated with the BBSome and Intraflagellar Transport. *PLoS Genetics* doi: 10.1371/journal.pgen.1006469
4. Timbers, T.A., Garland, S.J., Mohan, S., Flibotte, S., Edgley, M., Muncaster, Q., Au, V., Li-Leger, E., Rosell, F.I., Cai, J., Rademakers, S., Jansen, G., Moerman, D.G. and Leroux, M.R. (2016). Accelerating Gene Discovery by Phenotyping Whole-Genome Sequenced Multi-mutation Strains and Using the Sequence Kernel Association Test (SKAT). *PLoS Genetics* doi: 10.1371/journal.pgen.1006235
5. Mohan, S., Timbers, T.A., Kennedy, J., Blacque, O., and Leroux, M.R. (2013). Striated and non-filamentous forms of rootletin maintain ciliary function. *Current Biology* 23(20):2016-22. doi: 10.1016/j.cub.2013.08.033
6. Li, C.*, Timbers, T.A.*, Rose, J.K., Bozorgmehr, T, McEwan, A. and Rankin, C.H. (2013). The FMRFamide-related neuropeptide FLP-20 is required in the mechanosensory neurons during memory for massed training in *C. elegans*. *Learning & Memory* 20(2):103-108. *Authors contributed equally. doi: 10.1101/lm.028993.112
7. Lau, H.L., Timbers, T.A., Mahoumad, R., and Rankin, C.H. (2013). Genetic dissection of memory for associative and non-associative learning in *C. elegans*. *Genes, Brain and Behavior* 12(2):210-23. doi: 10.1111/j.1601-183X.2012.00863.x
8. Timbers, T.A.*, Giles, A.C.*, Ardiel, E. L., Kerr, R. and Rankin, C. H. (2013). Intensity discrimination deficits cause habituation changes in middle-aged *Caenorhabditis elegans*. *Neurobiology of Aging* 34(2): 621-631. *Authors contributed equally. doi: 10.1016/j.neurobiolaging.2012.03.016
9. Timbers, T.A. and Rankin, C.H. (2011). Tap withdrawal circuit interneurons require CREB for long-term habituation in *Caenorhabditis elegans*. *Behavioral Neuroscience* 125(4): 560-566. doi: [10.1037/a0024370]) (http://psycnet.apa.org/doi/10.1037/a0024370)

10. Yack, J. E., Timbers, T. A.,Conner, W. E., Aiello, A. and Schroeder, F. C. (2004). Defensive flocculent emissions in a Tiger moth, *Homoeocera stictosoma* (Arctiidae:Arctiinae). *Journal of the Lepidopterists' Society* 58(3): 173-177.

## RESEARCH PREPRINTS:

1. Timbers, T.A., Ardiel, E.L., Lee, K.C.Y., Safaei, J., Pelech, S.L., and Rankin, C.H. (2017). CaMK (CMK-1) and O-GlcNAc transferase (OGT-1) modulate mechanosensory responding and habituation in an interstimulus interval-dependent manner in *Caenorhabditis elegans*. *bioRxiv* doi: 10.1101/115972 (*also submitted to Genetics*)

2. Timbers, T.A., Garland, S., Mohan, S., Flibotte, S., Edgley, M., Muncaster, Q., Moerman, D., and Leroux, M. (2015). Accelerating gene discovery by phenotyping whole-genome sequenced multi-mutation strains and using the sequence kernel association test (SKAT). *bioRxiv* doi: 10.1101/027540 (*also published in PLoS Genetics*)

## MANUSCRIPTS UNDER REVISION AND/OR SUBMITTED:

1. Timbers, T.A., Ardiel, E.L., Lee, K.C.Y., Safaei, J., Pelech, S.L., and Rankin, C.H. (*submitted to Genetics*, MS ID#: GENETICS/2017/202044). CaMK (CMK-1) and O-GlcNAc transferase (OGT-1) modulate mechanosensory responding and habituation in an interstimulus interval-dependent manner in *Caenorhabditis elegans*.

2. Loucks, C.M., Walker, D.S., McEwan, A.H., Timbers, T.A., Ardiel, E.L., Grundy, L.J., Johnson, J., Kennedy, J., Blacque, O.E., Schafer, W.R., Rankin, C.H., and Leroux, M.R. (*under revision in Current Biology*, MS ID#: CURRENT-BIOLOGY-D-16-01552). EFHC1, a protein linked to juvenile myoclonic epilepsy, functions at the cilium and synapse to modulate dopamine signaling.

## MANUSCRIPTS IN PREPARATION:

1. Timbers, T.A., Ready, B., Baxi, K., Leroux, M.R., and Carvalho, C. (*In preparation for Nature Cell Biology).* Shugoshin: also protecting the centromere and cilia signaling?

2. Timbers, T.A.*, Loucks, C.*, and Leroux, M.R. (*In preparation for PLoS Biology*). Genetic bases for naturally\ occurring variations in locomotory and avoidance behaviors in *C. elegans*. *authors contributed equally

## PUBLISHED BOOK CHAPTERS:

1. Timbers, T.A., Frame, A.K., Rankin, C.H. (2017). Learning and Memory in Invertebrates: C. elegans. In Reference Module in *Neuroscience and Biobehavioral Psychology*, Elsevier, 2017. ISBN 9780128093245

2. Timbers, T.A. and Rankin, C.H. (2008). Learning and memory in invertebrates: *C. elegans*. In: Squire, L., Albright, T., Bloom, F., Gage, F and Spitzer, N. (eds.) *Encyclopedia of Neuroscience,* Volume 5, pp. 413-421. Oxford: Elsevier.

3. Timbers, T.A., and Rankin, C.H. (2008). *Caenorhabditis elegans* as a model system in which to study the fundamentals of learning and memory. In Guadagnoli, M. (ed.) *Human Learning: Biology, Brain and Neuroscience*. pp. 227-242. Oxford: Elsevier.

## INVITED PRESENTATIONS:

1. Timbers, T.A., Silva., R, and Smith, G. (2017). Career Pathways Panel. *Software and Data Carpentry* (Online conference call, registration required)

2. Gerstein, M., Leek, J., Hoffman, M., Nattestad., M., and Timbers, T.A., (2016). Education Forum and Panel Discussion. *Cold Spring Harbor Laboratory Biological Data Science Meeting* (Cold Spring Harbor, NY)

3. Timbers, T.A. (2015). Using the Python data toolkit. *Vancouver Python Day 2015, Vancouver Python User Group* (Mobify HQ, Vancouver, BC, Canada)

4. Timbers, T.A., Garland, S., Mohan, S., Flibotte, S., Edgley, M., Moerman, D., and Leroux, M. (2014). Accelerating genetic screens using the sequence kernel association test (SKAT) and deep-sequenced multi-mutation strains. *Centre for Cell Biology, Development & Disease, Simon Fraser University* (Burnaby, BC, Canada)

5. Timbers, T.A., Jensen, V., Garland, S., Moerman, D., and Leroux, M.R. (2012). Screening a million mutations to identify novel ciliary proteins. *Dept. of Biology, University of Saskatchewan*\ (Saskatoon, SK, Canada)

6. Timbers, T.A., Jensen, V., Garland, S., Moerman, D., and Leroux, M.R. (2012). Screening a million\ mutations to identify novel ciliary proteins. *CIFAR Genetic Networks Meeting* (Toronto, ON, Canada)

## CONFERENCE PRESENTATIONS:

1. Timbers, T.A., Loucks, C., Flibotte, S., Moerman, D.G., and Leroux, M.R. (2016). Combining phenome and genome to uncover the genetic basis for naturally occurring differences in development and behaviour. *Cold Spring Harbor Laboratory Biological Data Science Meeting* (Cold Spring Harbor, NY) Talk

2. Timbers, T.A., Garland, S., Mohan, S., Flibotte, S., Edgley, M., Muncaster, Q., Moerman, D., and Leroux, M. Accelerating gene discovery by phenotyping the deep-sequenced Million Mutation Project strains and using genome-wide statistical analysis approaches. 20*th International C. elegans Meeting* (Los Angeles, CA, USA) Poster

3. Timbers, T.A., Garland, S., Mohan, S., Flibotte, S., Edgley, M., Muncaster, Q., Moerman, D., and Leroux, M. Genome-wide association for sensory neuron function in *C. elegans* using an automated behavioural tracking system. *9th Annual Canadian Association of Neuroscience* (Vancouver, BC) Poster

4. Timbers, T.A. Jensen, V., Garland, S., Lee, K., Edgley, M., Moerman, D., and Leroux, M.R. (2014). High- content screening of a deep-sequenced Metazoan mutant library to reveal novel factors for sensory neuron function. *Dept. of Molecular Biology and Biochemistry Colloquium* (Burnaby, BC) Talk

5. Timbers, T.A., Jensen, V., Garland, S., Edgley, M., Moerman, D., and Leroux, M.R. (2013). Screening a million mutations to identify novel ciliary proteins. *Genes, Circuits and Behavior Cell Symposia* (Toronto, ON) Poster

6. Timbers, T.A., Jensen, V., Lee, K., Garland, S., Edgley, M., Moerman, D., and Leroux, M.R. (2013). Screening a million mutations to identify novel ciliary proteins. *19th International C. elegans Meeting*\ (Los Angeles, CA, USA) Poster

7. Ready, B.*, Timbers, T.A.*, Baxi, K., Leroux, M.R. and Carvalho, C. (2013). The role of the *C. elegans* Shugoshin homolog in sensory neurons. *19th International C. elegans Meeting* (Los Angeles, CA, USA) Poster *Authors contributed equally.

8. Timbers, T.A., Jensen, V., Lee, K., Garland, S., Edgley, M., Moerman, D., and Leroux, M.R. (2012). Screening a million mutations to identify novel ciliary proteins. *Annual Meeting of the American Society for Cell Biology* (San Francisco, CA, USA) Poster

9. Mohan, S., Timbers, T.A., Leroux, M.R. (2012). Rootletin is required for intraflagellar transport and ciliary maintenance. *Annual Meeting of the American Society for Cell Biology* (San Francisco, CA, USA) Poster

10. Timbers, T.A., Ardiel, E.L., and Rankin, C.H. (2012). Calcium/Calmodulin-dependent protein\ kinase 1 is required for short-term habituation. *Sixth Annual Canadian Association of Neuroscience Meeting* (Vancouver, BC) Poster

11. Timbers, T.A., Xu., J., Rankin, C.H. (2011) Ca2+-CaM-dependent protein kinase I is required for short- and long-term mechanosensory habituation. *18th International C. elegans Meeting*\ (Los Angeles, CA, USA) Poster

12. Timbers, T.A., Jing Xu, Andrew C. Giles and Rankin, C.H. (2010). Ca2+-CaM-dependent protein kinase I is required for short- and long-term mechanosensory habituation. *C. elegans. Neuronal Development, Synaptic Function, and Behavior Topic Meeting.* (Madison, WI, USA) Poster

13. Timbers, T.A. and Rankin, C.H. (2009). The Role of the Calcium/Calmodulin-dependent protein kinase cascade in mechanosensory habituation. *17th International C. elegans Meeting.* (Los Angeles, CA) Talk

14. Timbers, T.A. and Rankin, C.H. (2008). Molecular mechanisms that contribute to the induction of long-term memory for mechanosensory habituation in *C. elegans*. *Society for Neuroscience Annual Meeting*. (Washington, DC, USA) Poster

15. Timbers, T.A. and Rankin, C.H. (2008). Long-term mechanosensory habituation is dependent upon CMK-1 and CRH-1 in *Caenorhabditis elegans*. *C. elegans Neuronal Development, Synaptic Function, and Behavior Topic Meeting*. (Madison, WI, USA) Talk

16. Timbers, T.A. and Rankin, C.H. (2008). A CaMK/CREB-dependent pathway contributes to the molecular mechanisms for long-term habituation in *Caenorhabditis elegans*. *2nd Annual Canadian Association of Neuroscience Meeting*. (Montreal, QC, Canada) Poster

17. Timbers, T.A. and Rankin, C.H. (2008). A CaMK/CREB-dependent pathway contributes to the molecular mechanisms for long-term habituation in *Caenorhabditis elegans*. *Symposium on Biological Complexity: Genes, Circuits and Behavior*. (La Jolla, CA, USA) Poster

18. Timbers, T.A. and Rankin, C.H. (2007). CREB is necessary for long-term memory for habituation and for memory associated changes in glutamate receptor subunit expression in *Caenorhabditis elegans*. *The International Behavioral Neuroscience Society's 16th Annual Meeting*. (Rio de Janeiro, Brazil) Talk

19. Timbers, T.A. and Rankin, C.H. (2007). CREB is necessary for long-term memory of habituation in *C. elegans*. *Eighth International Congress of Neuroethology*. (Vancouver, BC, Canada) Poster

20. Timbers, T.A. and Rankin, C.H. (2007). A mutation in CREB disrupts long-term memory for habituation and blocks memory associated changes in glutamate receptor subunit expression. *1st Annual Canadian Association of Neuroscience Meeting*. (Toronto, ON, Canada) Poster

21. Timbers, T.A., Rose, J.K., Rankin, C.H. (2006). Reconsolidation of long-term memory in *Caenorhabditis elegans*. *Neuronal Development, Synaptic Function & Behavior C. elegans Topic Meeting #2*. (Madison, WI, USA) Poster

22. Timbers, T.A., Rose, J.K., Rankin, C.H. (2006). Long-term memory in *C. elegans* is subject to reconsolidation. *The International Behavioral Neuroscience Society's 15th Annual Meeting*. (Whistler, BC, Canada) Poster