Thomas (Tom) Bochynek, Ph.D., Dipl.-Biol.
2525 Eastwood Av, Apt 7a
Evanston, IL
USA

+1 (773) 739 3249
Tom.Bochynek@gmail.com
www.thomasbochynek.com

Curriculum Vitae

Education

Ph.D., Information Technology 09/2013 - 03/2017
Monash University *Melbourne, Australia*

Thesis on self-organised infrastructure construction in leaf-cutter ants
System-level and agent-based modeling of collective construction mechanism, energetics, and evolution

Dipl.Biol. (~B.Sc. + M.Sc.), Behavioural Ecology 07/2004 - 10/2011
Ruhr-Universität Bochum - highest grade "sehr gut" *Bochum, Germany*

Thesis on collective nest-construction in weaver ants
Analysis of collective and individual-level leaf folding behaviour

Research Experience

Postdoctoral Fellow, School of Engineering 07/2018 - ongoing
Northwestern University *Evanston, USA*

Imaging and modelling self-assembly in *Eciton* army ants via CT scans and individual-based models

Postdoctoral Research Assistant, School of Biological Sciences 10/2017 - 02/2018
Monash University *Melbourne, Australia*

Designed evolutionary models of sex allocation in basal plants

Research Assistant, SensiLab 06/2015 - 03/2017
Monash University *Melbourne, Australia*

Designed behavioural AI of palaeontological lifeforms for Augmented Reality teaching application

Research Assistant, Machine Learning Group 06/2015 - 09/2016
Monash University *Melbourne, Australia*

Annotated medical records for automated data extraction and contributed to design of semantic framework

Research Assistant, Behavioural Ecology Group 03/2011 - 11/2011
James Cook University *Townsville, Australia*

Collected and statistically analysed behavioural and spatial data on ant nest construction

Teaching Experience

Sessional Lecturer, Faculty of Information Technology 02/2018 - 06/2018
Monash University *Melbourne, Australia*

Primary lecturer of class "AI, ALife, and digital environments". Delivered lectures and lead practical coding classes, designed and graded exams and class assignments.

Teaching Associate, School of Biological Sciences 07/2014 - 10/2014
Monash University *Melbourne, Australia*

Supervised second year biology course and demonstrated laboratory techniques

Teaching Associate, Behavioural Biology Group 08/2009 - 02/2010
Ruhr-Universität *Bochum, Germany*

Designed and taught experiments in undergraduate course "Behavioural Ecology", and marked reports.

Supervision Experience

Mr. James Tanner, Monash University, Australia. Unofficial supervisor of Undergraduate Research Experience class student. Oversaw data extraction and analysis of different foraging cycles in leaf-cutter ants. Results published in journal article.

Supervisor of 15 biology undergraduate student volunteers aiding in data extraction over duration of 1.5 years. Delivered talk for context and introduced general data extraction standard operating procedures.

Publications

Please visit Google Scholar for current list.

1. **Bochynek, T.**, Burd, M., Kleineidam, C.J., and Meyer, B. (2019) – Infrastructure construction without information exchange: the trail clearing mechanism in *Atta* leafcutter ants. Proceedings of the Royal Society B: Biological Sciences 286: 20182539
2. **Bochynek, T.**, Tanner, J., Meyer, B., and Burd, M. (2017) – Parallel foraging cycles for different resources in leaf-cutting ants: a clue to the mechanisms of rhythmic activity. Ecological Entomology 42(6): 849-852
3. **Bochynek, T.**, Meyer, B., and Burd, M. (2017) – Energetics of trail clearing in the leaf-cutter ant *Atta*. Behavioral Ecology and Sociobiology 71: 14
4. Macfarlan, B., Anderson, M., Boyce, J., Chandler, T., **Bochynek, T.**, Yeates, M., and Maynard, C. (2017) – Monash Rocks: The first step in an augmented reality journey through deep time. In H. Partridge, K. Davis, & J. Thomas. (Eds.), Me, Us, IT! Proceedings ASCILITE2017: 34th International Conference on Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education 138-141
5. **Bochynek, T.** and Robson, S. K. A. (2014) – Physical and Biological Determinants of Collective Behavioural Dynamics in Complex Systems: Pulling Chain Formation in the Nest-Weaving Ant *Oecophylla smaragdina*. PLOS ONE 9(4): e95112
6. Shmanina, T., Zukerman, I., Cheam, A. L., **Bochynek, T.**, and Cavedon, L. (2016) – Corpus of Tables in Full-Text Biomedical Research Publications. Conference on Computational Linguistics 2016 7079
7. Ihlow, F., Rödder, D., **Bochynek, T.**, Sothanin, S., Handschuh, M., and Böhme, W. (2014) – Reinforcement as a conservation toolassessing site fidelity and movement of the endangered elongated tortoise *Indotestudo elongata* (Blyth, 1854). Journal of Natural History 48: 39-40

Awards & Scholarships

Northwestern University Centre for Leadership Fellowship (USD 1000)	2018
Monash University Postgraduate Publication Award (USD~3251)	2016
Faculty of IT Supplementary Funding Award, used for research visit (USD~3600)	2016
Best Student Presentation at ASSAB 2016 conference (signed textbook)	2016
Three Minute Thesis Competition faculty winner (USD~360)	2015
"Highly commended" poster at Monash IT Innovation Showcase	2015
Two national and one state price at GovHack Hackathon (USD~1083)	2015
Monash International Postgrad Research Scholarship (USD~68,275)	2013
CSIRO Data61 / NICTA Top-up Scholarship (USD~17,700)	2013
Monash University Faculty Scholarship (USD~93,563)	2013
Total funds:	USD~188,800

Conference Presentations

Mechanism of self-organised infrastructure construction	Amsterdam, NL	ECCS 2016
(Invited) Regulatory mechanism in leaf-cutter ant foraging	Amsterdam, NL	ECCS 2016
Concurrent foraging patterns in leaf-cutter ants *Atta*	Sydney, AUS	ASSAB 2016
Costs and benefits of clearing physical trails in leaf-cutter ants *Atta*	Cairns, AUS	Behaviour 2015
Dynamics of collective worksite selection in weaver ants	Cairns, AUS	IUSSI 2014

Media Coverage

- nature Research Highlights: Ants build superhighways without bosses or blueprints
- ABC The Science Show: Leaf-cutter ants - the ultimate egalitarian workforce
- NZZ: Blattschneiderameisen berlassen das Putzen dem Zufall – mit Erfolg
- Süddeutsche Zeitung: Spezialisten der Straßenreinigung

Skills

Programming languages: Python, Mathematica, Matlab, Java, C++, LaTeX

Computational skills: Agent-based and system modelling in Python and Mathematica; data extraction via computer vision using OpenCV; machine learning using artificial neural networks and genetic algorithms; evolutionary game theory simulation; cellular automata

Experimental skills: Experimental setup construction: CAD & 3D printing, Arduino-based setup control, automated data extraction. Behavioural experiment design and execution, field work experience on 4 continents.

Other proficiencies: Git, Unix/Linux, ImageJ, GIS, Adobe & MS Office suites

Professional Activities

- Reviewer for Nature Scientific Reports, Behavioural Ecology and Sociobiology, PLOS ONE, Insectes Sociaux
- Initiator, organiser, and moderator of two-day Monash IT Research Retreat. Event received USD~50,670 in faculty funds. Led a team of ten PhD students for eight months, organising guest-speakers and research workshops. Event brought together PhD students from three Monash campuses (including from Malaysia) and is now repeated every two years.
- Student Representative to the Monash IT Graduate Research Committee. Aided in shaping faculty policies

- Four-time speaker at Monash PhD Student Induction Day; Presenter at Monash Univeristy Open Days and Innovation Showcases; Presenter at NICTA Tech Showcase
- Student Representative on Monash University academic conduct committees

Visited Institutions & Collaborators

La Selva Research Station, Costa Rica	Field work on leaf-cutter ant trail clearing	2017
Dr. Duarte, Exeter University, UK	Modelling of leaf-cutter ant trail clearing	2016
Prof. Kleineidam, Konstanz University, Germany	Laboratory work on leaf-cutter ant trails	2014
Smithsonian Tropical Research Institute, Panama	Field work and modelling; CT scanning of army ant nests	2013 & 2019
Prof. Simon Robson, James Cook University, Australia	Field work and modelling of weaver ant nest construction	2010-2011 & 2017
Danum Valley Field Centre, Sabah, Malaysia	'Ant Course' Field Course	2010
Panay Eco-Social Conservation Project, Philippines	Field work on spiny ant aggression	2009

Other Passions

Fishing, camping, hiking, snorkelling & diving, photography, travelling, juggling, drawing & painting, carving & crafts. Book worm and e-book aficionado, avid tea sampler, amateur Go player.