

Andrew T. Burchill

BIOLOGIST · DATA SCIENTIST · WANNABE ENGINEER

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“To whatever thing we first turn our eyes, it is a wonder and full of wonders, if only we examine it for a little.” —Giovanni de Dondi

Education

Arizona State University

Tempe, Arizona

PH.D. IN ANIMAL BEHAVIOR, CONCENTRATION IN COMPLEX ADAPTIVE SYSTEMS SCIENCE

Aug. 2015 - Jul. 2022

- Co-Advisors: Dr. Theodore P. Pavlic and Dr. Stephen C. Pratt
- Dissertation Topic: *The Regulation of Colony-Level Foraging Behavior Under Different Information Constraints*

Arizona State University

Tempe, Arizona

M.S.P. IN ANIMAL BEHAVIOR

Jun. 2018

University of Chicago

Chicago, Illinois

B.S. IN BIOLOGICAL SCIENCES, SPECIALIZATION IN ECOLOGY AND EVOLUTION

2010 - 2014

- Graduated with General Honors, Dean's List each year
- University Scholar recipient

Recent Grants & Awards

EXTERNAL

2021	Scientists in Parks (SIP) Fellowship , Ecological Society of America, National Park Service	\$7,000+
2019	2nd Place, Graduate 10-minute Presentation Competition , Entomological Society of America	free membership
2018	Graduate Research Opportunities Worldwide (GROW) , National Science Foundation (NSF)	\$5,000
2017	Endeavour Research Fellowship , Australian Government Department of Education and Training	~\$24,000
2017	Best Paper of 2016 , International Union for the Study of Social Insects	\$1,000
2016	Global Development Research Fellowship , Smithsonian Tropical Research Institute and USAID	\$7,000+
2015	Congressional Award , (Highest civilian honor awarded by U.S. Congress for service)	
2015	Presidential Volunteer Service Award ,	
2015	Graduate Research Fellowship Program (GRFP) , National Science Foundation (NSF)	\$34,000/year
2015	Segal AmeriCorps Education Award , Corporation for National and Community Service	\$5,645
2015	Classroom Science Educator Award , Graduate Partners in Science Education	
2010-14	University Scholar Merit Scholarship , University of Chicago	\$10,000/year
2013	REU for Access to Global Biodiversity Studies , (NSF Grant DBI 1156594)	\$7,350+
2012	REU in the Gulf of Maine and the World Oceans , (NSF Grant OCE 1156740)	\$5,000+

INTERNAL

2021	Graduate Student Completion Grant , ASU Social Insect Research Group (SIRG)	
2018	The Rob Page Student Research Grant , ASU Social Insect Research Group (SIRG)	\$1,300
2017	JumpStart Grant , ASU Graduate and Professional Student Association	\$500
2017	Athletics Research Grant , ASU Graduate and Professional Student Association	\$1,210
2016-22	CLAS Graduate Excellence Award , ASU College of Liberal Arts and Sciences	\$300, \$100 x5
2015, 16, & 18	Individual Travel Grant , ASU Graduate and Professional Student Association	\$950 x3
2016	RTI Graduate Training Award , School of Life Sciences at ASU	\$2,500
2016, 17, 19, & 22	SoLS Travel Award , School of Life Sciences at ASU	\$400 x4
2017, 19 & 22	Graduate College Travel Award , ASU Graduate College	\$350 x3

Publications

- [1] Toyokawa, W., **A.T. Burchill**, T. Sasaki, K. Inukai, T. Kameda, S.C. Pratt. Ants vs Humans: Exploration, Exploitation, and Social Information in a Dynamic Environment. (*pending submission*)
- [2] **Burchill, A.T.**, L. Jones, and J. McLean. Extreme genus-specific locomotory mimicry in ant-mimicking spiders. (*pending submission*)
- [3] **Burchill, A.T.**, T.P. Pavlic, S.C. Pratt, C.R. Reid. Weaver ants regulate the rate of prey delivery during collective vertical transport. Preprint: *bioRxiv* (2022) doi:<https://doi.org/10.1101/2022.06.22.497253>
- [4] **Burchill, A.T.** Long-term, active suspension of larvae by adult *Leptomyrmex* ants. *Ecology* (2020) doi:<https://doi.org/10.1002/ecy.3267>
- [5] **Burchill, A.T.**, T.P. Pavlic. Dude, where's my mark? Creating robust animal identification schemes informed by communication theory. *Animal Behavior* (2019) doi:10.1016/j.anbehav.2019.05.013
- [6] **Burchill, A.T.** "rabi 0.1.0: Generate Codes to Uniquely and Robustly Identify Individuals for Animal Behavior Studies." CRAN, (2017) <https://CRAN.R-project.org/package=rabi>
- [7] Winston, M.E., A. Thompson, G. Trujillo, **A.T. Burchill**, and C.S. Moreau. Novel approach to heritability detection suggests robustness to paternal genotype in a complex morphological trait. *Ecology and Evolution* (2017) doi:10.1002/ece3.2932
- [8] **Burchill, A.T.**, and C.S. Moreau. Colony size evolution in ants: macroevolutionary trends. *Insectes Sociaux*, (2016) 63: 291. doi:10.1007/s00040-016-0465-3

Presentations

INVITED TALKS

Università di Pisa's 1st International Archaeological Dermatoglyphs Conference

[Online Zoom presentation](#)

A NEW STATISTICAL APPROACH FOR ARCHAEOLOGICAL FINGERPRINTS

Nov. 2021

(NPS) Great Lakes Inventory & Monitoring Network Meeting, 2021

[Online Zoom presentation](#)

HERBIVORY, BIRDS, AND PARK MANAGEMENT: USING HIERARCHICAL MODELLING TO ANALYZE SPECIES COMMUNITY DATASETS

Nov. 2021

Ecological Society of America, Water Cooler Chat

[Online Zoom panelist](#)

WRANGLING BIG DATA FOR NATURAL RESOURCE PROJECTS

Sep. 2021

Natural Resource Stewardship and Science Career Workshop

[Online Zoom presentation](#)

BIRD COMMUNITIES ACROSS THE GREATER LAKES NATIONAL PARKS

Jul. 2021

Behavioural Ecology Group @ Macquarie University, Mk. II

[Online Zoom presentation](#)

COLLECTIVE VERTICAL TRANSPORT IN THE WEAVER ANT *Oecophylla smaragdina*

Jul. 2020

Social Insect Research Group @ Arizona State University

[Tempe, AZ](#)

DRIVING PREY UP THE WALL: HOW ANTS COOPERATIVELY TRANSPORT OBJECTS UP VERTICAL SURFACES

Sep. 2019

Modelling and Simulation Seminar @ Monash University

[Melbourne, Australia](#)

GROCERY SHOPPING FOR ANTS: COLLECTIVE NUTRITION AND COLLECTIVE PREY RETRIEVAL

Dec. 2018

Insect Cognitive Neuroethology Group @ Macquarie University

[Sydney, Australia](#)

GROCERY SHOPPING FOR ANTS: COLLECTIVE NUTRITION AND COLLECTIVE PREY RETRIEVAL

Nov. 2018

Behavioural Ecology Group @ Macquarie University

[Sydney, Australia](#)

SPIDER-ANT LOCOMOTIVE MIMICRY AND COLLECTIVE NUTRITION

Nov. 2018

CONFERENCE PRESENTATIONS

Animal Behavior Society 2022 Meeting

[San José, Costa Rica](#)

NEW METHODS REVEAL THAT *Ectatomma ruidum* ANT COLONIES DEMONSTRATE POOR MACRONUTRIENT REGULATION ABILITIES

Jul. 2022

<p>International Union for the Study of Social Insects (IUSSI) 2022 NEW METHODS REVEAL THAT <i>Ectatomma ruidum</i> ANT COLONIES DEMONSTRATE POOR MACRONUTRIENT REGULATION ABILITIES</p>	<p>San Diego, CA Jul. 2022</p>
<p>Society for Integrative and Comparative Biology (SICB) 2022 MEASURING TEAM PERFORMANCE IN THE FIELD: WEAVER ANTS COMPENSATE FOR COLLECTIVE TRANSPORT CHALLENGES ON VERTICAL SURFACES</p>	<p>Phoenix, AZ Jan. 2022</p>
<p>Animal Behavior Society 2021 Meeting INTEGRATING INDIVIDUAL AND COLONY-LEVEL MACRONUTRIENT REGULATION IN ANTS WITH MICRO-RFID TRACKING</p>	<p>Online (COVID) Aug. 2021</p>
<p>Geological Society of America Connects 2021 HOW NATIONAL PARK MANAGEMENT AND CHANGING MOOSE POPULATIONS AFFECT BIRD COMMUNITIES IN THE GREAT LAKES REGION</p>	<p>Portland, OR Oct. 2021</p>
<p>ASSAB 2020 (Australasian Society for the Study of Animal Behaviour) ANTS, DANCE, EVOLUTION!: EXTREME LOCOMOTORY MIMICRY IN AUSTRALIAN JUMPING SPIDERS</p>	<p>Online (COVID) Sep-Oct. 2020</p>
<p>Evo Symposium 2020 ANTS, DANCE, EVOLUTION!: EXTREME LOCOMOTORY MIMICRY IN AUSTRALIAN JUMPING SPIDERS</p>	<p>Tempe, Arizona Aug. 2020</p>
<p>Animal Behaviour Live ANTS, DANCE, EVOLUTION!: EXTREME LOCOMOTORY MIMICRY IN AUSTRALIAN JUMPING SPIDERS (YouTube video link here)</p>	<p>Online Aug. 2020</p>
<p>International Society for Neuroethology: Insect Navigation Workshop 2020 COLLECTIVE VERTICAL TRANSPORT IN THE WEAVER ANT <i>Oecophylla smaragdina</i></p>	<p>Online (COVID) Aug. 2020</p>
<p>Behaviour 2020 ANTS, DANCE, EVOLUTION!: EXTREME LOCOMOTORY MIMICRY IN AUSTRALIAN JUMPING SPIDERS (YouTube video link here)</p>	<p>Online (COVID) July. 2020</p>
<p>Entomology 2019 COOPERATIVE TRANSPORT ON VERTICAL SURFACES: LEARNING FROM ARBOREAL ANTS 2nd Place, Graduate 10-minute Presentation Competition for President's Prize</p>	<p>St. Louis, Missouri Nov. 2019</p>
<p>Behaviour 2019 VERTICAL COLLECTIVE TRANSPORT IN THE WEAVER ANT <i>Oecophylla smaragdina</i></p>	<p>Chicago, Illinois Jul. 2019</p>
<p>2019 Southwest Robotics Symposium COOPERATIVE TRANSPORT ON VERTICAL SURFACES: LEARNING FROM ARBOREAL ANTS</p>	<p>Tempe, Arizona Jan. 2019</p>
<p>International Union for the Study of Social Insects (IUSSI) 2018 COLLECTIVE TRANSPORT UP VERTICAL SURFACES IN THE WEAVER ANT <i>Oecophylla smaragdina</i></p>	<p>Guarujá, Brazil Aug. 2018</p>
<p>Entomological Society of America 2017 MACRONUTRIENT REGULATION AND FORAGING STRATEGIES IN THE NEOTROPICAL ANT, <i>Ectatomma ruidum</i></p>	<p>Denver, Colorado Nov. 2017</p>
<p>DDM Bio 2017 (Data-Driven Modelling Workshop) HARNESSING ENGINEERING PRACTICES TO ANALYZE BIOLOGICAL DATA</p>	<p>Raleigh, North Carolina Jun. 2017</p>

International Congress of Entomology (ICE) 2016

CONSISTENT SELF-ORGANIZED FORAGING ALLOCATIONS IN THE MACRONUTRIENT-REGULATING CARPENTER ANT,
Camponotus fragilis

Orlando, Florida

Oct. 2016

International Union for the Study of Social Insects (IUSSI) 2016

HUMANS VS. ANTS: COMPARING EXPLORATION-EXPLOITATION MECHANISMS IN A DYNAMIC ENVIRONMENT

Orlando, Florida

Oct. 2016

Frontiers in Insect Biology: Universität Würzburg Symposium

THE EVOLUTION OF COLONY SIZE IN ANTS: MACROEVOLUTIONARY PATTERNS

Tempe, Arizona

2015

6th International Max Planck Research School for Organismal Biology's Selection Symposium

THE EVOLUTION OF COLONY SIZE IN ANTS: MACROEVOLUTIONARY PATTERNS

Universität Konstanz, Germany

2015

5th Annual Field Museum of Natural History/Chicago Botanical Gardens Joint Research Symposium

ANALYZING THE GENETIC COMPONENT IN CASTE DETERMINATION OF NEOTROPICAL ARMY ANTS

Chicago, Illinois

2013

Midstates Consortium for Math and Science: Research Symposium in the Biological Sciences and Psychology

ANALYZING THE GENETIC COMPONENT IN CASTE DETERMINATION OF NEOTROPICAL ARMY ANTS

St. Louis, Missouri

2013

Bigelow Laboratory for Ocean Sciences REU Symposium

DETECTING EVOLUTIONARY SELECTION IN HIGHLY CONSERVED PROTEINS: PHYSIOCHEMICAL SHIFTS IN THE
MAMMALIAN CYTOCHROME B

East Boothbay, Maine

2012

Service and Outreach

ACADEMIC SERVICE

Isle Royale National Park

MACHINE LEARNING ENGINEER & SCIENTIST IN PARK FELLOW

Houghton, MI

2021

- Designed a user-friendly Bayesian analysis pipeline for species community monitoring, from proposal to production
- Successfully led & coordinated an inter-agency team (federal NPS ecologists, I&M staff, local university ornithologists)
- Advised C-level executives from 9 national parks, leading to management decisions averting an unnecessary, costly (\$500k) project
- Implemented self-directed QA/QC measures to bring decades of unstructured, volunteer-collected survey data up research-quality standards

Skype a Scientist

SCIENTIST

online@skypeascientist.com

2018 - 2021

- Contacted elementary classrooms (India, Canada, USA) and provided educational resources to teachers
- Helped teachers design personalized, grade-appropriate curricula for classes
- Answered student questions in Skype sessions about my science and being a scientist

Phoenix Comic Fest 2018

INVITED SCIENCE PANELIST

Phoenix, Arizona

2018

- Worked with education nonprofit RealTimeSTEAM to produce engaging science outreach for over 4,500 convention attendees
- Presented research and led open discussion in pop-culture themed panels, e.g. "Be Vewy Vewy Quiet: Hunting Strategies in Nature"

Global Locust Initiative at ASU

OUTREACH VOLUNTEER

Tempe, Arizona

2018

- Brought locust-centered science demonstrations into public spaces, featuring live grasshoppers
- Engaged with pedestrians on issues of global food security and entomology

Ask a Biologist! (47 million views in 2020)

[online @ askabiologist.asu.edu](https://askabiologist.asu.edu)

SCI-COM WRITER AND "DR. BIOLOGY" DIRECTOR

2015 - Present

- Answered biology-oriented questions fielded from K-12 students across the globe
- Wrote articles summarizing recent scientific publications and addressing misconceptions in an engaging, kid-accessible way
- Writing samples: [trap-jaw ant escape behavior](#), [evolutionary medicine and osteoporosis](#), [mathematical modeling of fat storage](#), and [when do theories become facts?](#)

Dr. Stephen Pratt's Lab

[Tempe, Arizona](#)

LAB SUPPLY MANAGER

2017 - 2022

- Organized and maintained stocks and ordered supplies for over 20 researchers and volunteers
- Interfaced with business office and balanced multiple financial accounts

Graduate Executive Board, ASU School of Life Sciences

[Tempe, Arizona](#)

GRADUATE RECRUITMENT ORGANIZER

2019 - 2020

- Acted as elected liaison between graduate students and departmental administration
- Organized school-wide recruitment events for prospective new grad students

Graduate Executive Board, ASU School of Life Sciences

[Tempe, Arizona](#)

SECRETARY

2017 - 2018

- Acted as elected liaison between graduate students and departmental administration
- Created and edited comprehensive orientation guide for new students
- Organized meetings, panels, and logistics for Executive board

Graduate Executive Board, ASU School of Life Sciences

[Tempe, Arizona](#)

OFFICER AND WEEKLY BROWNBAG COORDINATOR

2016 - 2017

- Acted as elected liaison between graduate students and departmental administration
- Planned department-wide events, and arranged and promoted weekly grad student-led research talks
- Controlled the allocation of over \$4,200 of departmental funds
- Provided varied catered lunches for 35-60 students on a weekly basis

Portraits of Science Art Exhibition

[The MonOrchid in Phoenix, Arizona](#)

PRESENTING ARTIST

2017

- Created textile art pieces inspired by original scientific data
- Presented art and described research to public in a gallery show with +1,000 visitors ([Video here](#) 📺)

Society for International Development, Annual Dinner 2016

[Washington D.C.](#)

ASU RESEARCH AMBASSADOR

Nov 30, 2016

- Attended the annual invite-only dinner and networking event on behalf of the USAID Global Development Research fellowship program (one of only six students at event)
- Met with ambassadors, congressmen, and heads of governmental agencies and nonprofits, explaining importance of leveraging possible ASU research partnerships
- Received training on publicly representing ASU and increasing presence via social media

Graduate and Professional Student Association at ASU

[Phoenix, Arizona](#)

VOLUNTEER GRANT REVIEWER

2015 - 2018

- Reviewed applications submitted by other students for GPSA grants
- Offered critical feedback and advice to grant-writers

Geophysical Sciences Student Union at the University of Chicago

[Chicago, Illinois](#)

TREASURER AND CATERING COORDINATOR

2012 - 2014

- Controlled the allocation of over \$6,500 of departmental funds
- Provided dinner for 15-30 students on a weekly basis
- Reached out to local restaurants for new catering options and partnerships

ADDITIONAL COMMUNITY SERVICE

AmeriCorps National Civilian Community Corps

Southwest Region (federal service)

PROJECT OUTREACH LIAISON, SERVICE LEARNING INITIATOR, AND CORPS MEMBER

2014 - 2015

- Engaged in multiple team-based community service projects, addressing critical needs in areas of disaster relief, environmental stewardship, energy conservation, and urban and rural development
- Contacted nonprofit organizations to arrange for possible future service opportunities
- Trained in conflict resolution, first aid, diversity awareness, demolition, and passenger van safety
- Organized weekly physical training activities and service learning opportunities for 8-person team

Hasbídító Community Nonprofit

Navajo Nation (near Cuba, NM)

GARDENER AND ADVISOR

Summer 2015

- Worked with residents to build ten common gardens to strengthen community infrastructure and local, sustainable food systems
- Designed and installed windbreaks, water-towers, irrigation lines, and raised beds to maximize crop yield
- Planted over 1,000 fruit-bearing trees in harsh desert conditions

BroStoMP FM Scavenger Hunt Team

Chicago, Illinois

"MR. KRAFT" AND CATERING COORDINATOR

2012 - 2014

- Won the largest scavenger hunt in the world, along with team
- Managed team budget of over \$500
- Provided catering and snacks for 400+ person team at several events

Teaching Experience

ACADEMIC TEACHING POSITIONS

Teaching Assistant for BIO 432: Why People Steal, Cheat, and Lie (online course)

Online

ARIZONA STATE UNIVERSITY (SCHOOL OF LIFE SCIENCES)

Spring 2022

- Utilized Canvas platform to lead (50) students in online active learning modules and provide support in discussion groups
- Graded lab reports and short responses, working with students one-on-one to improve science writing

Teaching Assistant for BIO 345: Organic Evolution (online course)

Online

ARIZONA STATE UNIVERSITY (SCHOOL OF LIFE SCIENCES)

Spring 2022

- Utilized Canvas platform to lead (150) students in online active learning modules and provide support in discussion groups
- Graded lab reports and short responses, working with students one-on-one to improve science writing

Teaching Assistant for BIO 112: Why Sex? (online course, created pre-COVID)

Online

ARIZONA STATE UNIVERSITY (SCHOOL OF LIFE SCIENCES)

Summer 2020

- Utilized Canvas platform to lead (40) students in online active learning modules and provide support in discussion groups
- Graded lab reports and short responses, working with students one-on-one to improve science writing

Laboratory Section Manager for BIO 361: Animal Physiology

Tempe, Arizona

ARIZONA STATE UNIVERSITY (SCHOOL OF LIFE SCIENCES)

Spring 2018

- Coordinated laboratory section; teaching vertebrate dissection, nerve conduction, respirometry, and other physiological experiments
- Developed all lecture material and quizzes for the course
- Graded lab reports and exams, working with students one-on-one to improve science writing

Assistant Lecturer for BIO 331: Animal Behavior

Tempe, Arizona

ARIZONA STATE UNIVERSITY (SCHOOL OF LIFE SCIENCES)

Spring 2017

- Co-lectured 150 biology students
- Developed lectures and outdoor active learning lessons
- Managed grading and assessments for all students

Teaching Assistant for BIO 345: Organic Evolution Laboratory

Tempe, Arizona

ARIZONA STATE UNIVERSITY (SCHOOL OF LIFE SCIENCES)

Fall 2016

- Coordinated with three-person team to teach 180 students evolutionary biology for majors
- Developed "laboratory" curriculum for evolution-based course
- Met with students one-on-one in weekly meetings to facilitate retention of course material

Teaching Assistant for BIOS 20150: A Serious Introduction to Biology for Majors

Chicago, Illinois

BIOLOGICAL SCIENCES COLLEGIATE DIVISION AT THE UNIVERSITY OF CHICAGO

2014

- Guided two groups of five students through semester-long group science project
- Scheduled regular conferences and led discussions, critiques, and brainstorming sessions
- Graded all written assignments, offering constructive feedback and answering concerns promptly

SERVICE-BASED/VOLUNTEER TEACHING

Prison Biology Education Group

Florence, Arizona

INSTRUCTOR AND CURRICULUM-DESIGNER

2019 - 2020

- Developed college-level introductory biology course for inmates in federal prison, despite very restrictive environment
- Mentored inmates through completion of student-led research projects
- Lectured classes and graded assignments

Graduate Partners in Science Education

Phoenix, Arizona

MENTOR AND LESSON PLANNER

2015 - 2016

- Designed active learning science lesson plans for middle-school classrooms
- Led weekly after-school science programs at local low-income school districts with co-teacher

Denver Green School

Denver, Colorado

5TH GRADE ASSISTANT MATH TEACHER AND TUTORING COORDINATOR

2014 - 2015

- Assisted in classroom teaching, discipline, and individualized lesson plan development
- Lead after-school tutoring program; instructing and preparing tutors in addition to tutoring
- Graded written assignments and met with students to discuss personalized improvement plans

Circle Pines Center Summer Camp

Delton, Michigan

CAMP COUNSELOR AND SCIENCE COORDINATOR

2014

- Designed and led science labs for campers which included field work, identification, and microscopy components
- Organized camp-wide activities highlighting issues of conservation and environmental stewardship
- Directly supervised and cared for junior campers (ages 11-13) throughout the day and night

YVIBE South Side Tutoring and Mentorship Program

Chicago, Illinois

TUTOR AND MENTOR

2011 - 2014

ADMINISTRATOR

2012

- Tutored underprivileged youth in reading, math, and science on a weekly, one-on-one basis
- Organized games, lesson plans, scientific lab demonstrations, and healthy snacks
- Supervised attendance, permission slips, and disciplinary measures

Undergraduate Student Mentoring

Amber Barr, Arizona State University Biology Major

Summer 2020 – Spring 2021

Ananth Sriram, Arizona State University Biology Major

Spring 2020 – Fall 2020

Cassius Cunningham (Honors thesis: Liquid Food Exchange in *Ectatomma ruidum*),

Spring 2017 – Summer 2019

Arizona State University Biology Major

Abigail Adams, Arizona State University Biology Major

Summer 2018 – Winter 2018

Samantha Castro, Arizona State University Biology Major

Spring 2018 – Summer 2020

Vlada Markov, Arizona State University Biology Major

Spring 2018 – Summer 2019

Mark Weser, Arizona State University Biology Major

Spring 2017 – Fall 2017

Tiana Schaefer, Arizona State University Biology Major

Spring 2017 – Fall 2017

Daxem Brems, Arizona State University Biology Major

Spring 2017 – Fall 2017

Ashton Grove, Arizona State University Biology Major

Fall 2016 – Spring 2017

Hillary Polk, Arizona State University Biology Major

Fall 2016 – Spring 2017