

# Jonathan Z. Shik

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## Associate Professor (Professor Promotion Program) & Section Head

Section for Ecology and Evolution, Department of Biology, University of Copenhagen,  
Universitetsparken 15, 2100 Copenhagen, Denmark

## Research Associate

Smithsonian Tropical Research Institute  
Apartado 0843-03092, Balboa, Ancon, Republic of Panama

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Nationality: USA • Marital status: Anne Sofie Kruse (Danish) with two children (2 & 6 years old)

## RESEARCH INTERESTS

Evolutionary biology, ecology, nutritional and metabolic physiology, ethology, molecular approaches, entomology, symbiosis, mycology, myrmecology, experimental design

## EDUCATION & APPOINTMENTS

**2026-present** Section Head, Section for Ecology & Evolution, UCPH  
**2025-present** Professor Promotion track  
**2021** Associate Professor (tenured), Section for Ecology & Evolution, UCPH  
**2019-present** Research Associate, Smithsonian Tropical Research Institute  
2018-2021 Assistant Professor, Section for Ecology & Evolution, University of Copenhagen  
2016-2018 Postdoctoral Researcher, Centre for Social Evolution, University of Copenhagen  
2014-2016 Marie Curie Postdoctoral Fellow, Centre for Social Evolution, University of Copenhagen,  
2013-2014 Postdoctoral Fellow, Smithsonian Tropical Research Institute  
2011-2013 Postdoctoral Research Associate, Dept. of Entomology, North Carolina State University  
2010 PhD, University of Oklahoma, USA  
2003 BSc, Biology, McGill University, Canada

## PERIODS OF LEAVE

2020 Paternity leave: 27/1/2020 – 14/4/2020, 12 weeks in total.  
2024 Paternity leave: 27/5/2024 – 15/8/2024, 12 weeks in total.

## GRANTS AND AWARDS

TOTAL FUNDING SINCE 2005: ~ €3,172,000 (23.630.000 DKK)

2023	Carlsberg Semper Ardens: Accelerate Grant	4.966.182 DKK
	Danish Research Council (DFF I FNU) Project 1 ( <i>start date delayed until 2024</i> )	2.878.000 DKK
2022	Villum Experiment Grant	1.993.568 DKK
2019	Acceptance to the UCPH Forward Program for Excellence in Research, <i>following competitive university-wide selection process</i>	19.000 DKK
2017	European Research Council Starting Grant (PI) ( <i>delayed start until 2019</i> )	>11 million DKK
2017	Finalist for a CNRS position at Pierre & Marie Curie University (Paris)	

2014	BIO Incentive grant from UCPH (Co-PI) for PhD Tropical Behavioral Ecology & Evolution course	67.000 DKK
2013	EU Marie Skłodowska Curie International Postdoctoral Fellowship ( <i>delayed start until 2014</i> )	1.7 million DKK
2013	Smithsonian Institution Postdoctoral Fellowship	400.000 DKK
2012	National Institute for Mathematical and Biological Synthesis	12.500 DKK
2004-2010	Alumni Fellowship, University of Oklahoma, recurred annually	160.000 DKK
Pre-2010	Competitive research grants secured during PhD ( <i>included a STRI Short Term Fellowship to perform research in Panama</i> )	138.000 DKK

### **Publications & Presentations**

- 54 publications in peer-reviewed journals (*4 currently In Review*).
- 1264 citations in Google Scholar; h=23, i10=36 (Google Scholar).
- 53 invited oral presentations at national & international meetings, and departmental seminars.
- 37 contributed oral presentations at national & international meetings.
- 24 contributed poster presentations at national and international meetings.

### **STUDENT AND POSTDOC SUPERVISION**

#### ONGOING POSTDOCTORAL RESEARCHERS

-Ayoub Stelate (2023-2026): Advanced imaging of a domesticated fungal symbiont (*main supervisor*)

#### ONGOING PHD RESEARCHERS

- Asta Rødsgaard-Jørgensen (2023-26): *Molecular mechanisms of crop domestication in leafcutter ants (main supervisor)*
- Aoife O'Brien (2024-27): *Nutritional mechanisms insect declines in Denmark (main supervisor, Prof. Hans Henrik Bruun, UCPH, co-supervisor)*

#### ONGOING AND NEW GRADUATE & UNDERGRADUATE PROJECTS

- Olivia-Sofie Basse Schougaard MSc thesis: "*DNA metabarcoding to reconstruct food webs of generalist insect herbivores*"
- Kristina Brunnbauer, MSc thesis: "*Nutritionally optimized organ-specific foraging by insect pathogenic *Metarhizium* fungi*"
- Maria Andersen, MSc thesis: "*Genetic diversity of nuclei in polykaryotic fungi domesticated by leafcutter ants*"
- Oscar Carlsen, MSc thesis: "*Nutritional intake targets of symbiotic and free-living fungi*"
- Victoria Madsen, MSc thesis (planned, Block 5): "*Nutritional ecology of Danish plant communities across a disturbance gradient*"
- Josefine Pedersen: MSc thesis (planned, Block 5): "*Nutritional niches of generalist insect herbivores in Denmark*"
- Nicolas Magnussen: BSc PUK (planned, Block 5): "*Ecology of disturbed plant communities in Denmark*"
- Yara-Marie Cardel: BSc PUK (planned, Block 5): "*Ecology of disturbed plant communities in Denmark*"
- Lea Gislason: BSc (planned, Block 5): "*Nutritional niches of pathogenic fungi infesting fungus farming systems*"

#### STUDENTS (SINCE 2017) (SEE TEACHING PORTFOLIO FOR DETAILS)

• 6 Postdocs / • 5 PhDs / • 23 MSc students / • 20 BSc students / • 3 Visiting PhD students / • 6 BSc international research interns

### **MAIN COLLABORATORS (IN ALPHABETICAL ORDER), FROM 10 COUNTRIES**

- Staff Scientist William Wcislo, Smithsonian Tropical Research Institute, Panama
- Professor Hans Thordal-Christensen, UCPH, Denmark
- Associate Professor Xavier Arnan, CREAM, Spain
- Lecturer, Tom Bishop, Cardiff University, United Kingdom
- Associate Professor Kristine Bohmann, UCPH, Denmark
- Professor Jacobus J. Boomsma, UCPH, Denmark
- Professor Hans Henrik Bruun, UCPH, Denmark
- Professor David Donoso, Escuela Politecnica Nacional, Quito, Ecuador
- Associate Professor Vasilis Kokkoris, Vrije University, The Netherlands
- Professor Audrey Dussutour, CNRS, Université Paul Sabatier, Toulouse, France
- Associate Professor Henrik de Fine Licht, UCPH, Denmark
- Professor Michael Poulsen, UCPH, Denmark
- Professor Heloise Gibb, La Trobe University, Australia
- Senior Lecturer Juliano Morimoto, University of Aberdeen, UK
- Professor Anders Michelsen, UCPH, Denmark
- Professor Riikka Rinnan, UCPH, Denmark
- Professor Andre Rodrigues, São Paulo State University, Brazil

### **SERVICE AS EDITOR**

2019-2025 Associate Editor, *Journal of Animal Ecology* (IF 4.46), handle ~12 papers per year

### **SERVICE AS PEER-REVIEWER FOR JOURNALS (IN ALPHABETICAL ORDER), ~12 PER YEAR**

Acta Ethologica, Agricultural and Forest Entomology, Animal Behaviour, Arthropod-Plant Interactions, Behavioral Ecology and Sociobiology, Biological Invasions, Biological Journal of the Linnean Society, Biology Letters, Current Zoology, Ecography, Ecological Entomology, Ecology, Ecology and Evolution, Ecology Letters, Ecosystems, Entomologia Experimentalis et Applicata, Environmental Entomology, European Journal of Entomology, Evolution, Evolutionary Biology, Functional Ecology, Global Change Biology, Insect Conservation and Diversity, Insects, Insectes Sociaux, Journal of Animal Ecology, Journal of Applied Entomology, Journal of Asia-Pacific Entomology, Journal of Insect Behavior, Journal of Insect Physiology, Journal of Insect Science, Journal of Thermal Biology, Myrmecological News, Naturwissenschaften, Oecologia, Oikos, PeerJ, PLoS One, Proceedings of the Royal Society B, Rangeland Ecology and Management, Revista Brasileira de Entomologia, Scientific Reports, Trends in Plant Science

### **SERVICE AS PEER-REVIEWER FOR GRANTING AGENCIES**

2022 National Science Center, Poland  
 2019 European Research Council (Advanced Grant)  
 2018 National Science Foundation, USA  
 Austrian Science Fund, Austria  
 2017 US-Israel Binational Agricultural Research and Development Fund (BARD: US-Israel)  
 Binational Science Foundation (BSF: US-Israel)

### **SERVICE AS PEER-REVIEWER ON GRANT REVIEW PANEL**

2024 Smithsonian Tropical Research Institute, Tupper Fellowship Committee, USA  
 2018 Fundação para a Ciência e a Tecnologia, I. P. (FCT) (Reviewed 25 proposals (15 as lead reviewer) for the Central Portuguese Funding Agency)

### **UNIVERSITY SERVICE (RECENT)**

2024 Development of curricula for newly established Fundamentals of PhD faculty-level course  
 2024-2027 Diversity, Equity & Inclusion Committee, Department of Biology, UCPH (DEI)  
 2024-2027 Department Faculty Board, Department of Biology, UCPH (DFB)  
 2024 Chair BIO PhD student evaluation committee (Guangshuo Li)

2022-2025	Strategic Research Committee, Department of Biology, UCPH (BIO-SFU) ( <u>Chair, starting January, 2025</u> )
2022	Chair BIO PhD student evaluation committee (Veronica Sinotte)
2021	Sustainability Committee, Department of Biology, UCPH
2018	Panelist and speaker in ERC Starting Grant Information Meeting, UCPH
2017-2018	Section for Ecology and Evolution weekly seminar organizer, UCPH
2017	BIO-Conference organizing committee, UCPH

### **PEDAGOGICAL TRAINING**

2024	Course for PhD supervisors in Responsible Conduct of Research
2024	Course in PhD supervision, UCPH
2020-2021	Teaching and Learning in Higher Education (Universitetspædagogikum), UCPH
2018	Introduction to University Pedagogy, UCPH

### **TEACHING EXPERIENCE**

My teaching and assessment resume spans over 20 years, and includes many class formats at the BSc, MSc, and PhD levels: 1) lectures with fewer than 10 to over 150 students, 2) research-based courses in the field with excursions lasting one day to six weeks, 3) lab-based exercises (including introduction to R-based statistics), and 4) exercises integrating field, discussions of theory, and lab research. I also have experience organizing and coordinating entire courses. My current teaching includes the following graduate-level courses:

Populationsbiologi (planned course responsible, 2026)	Fall 2026
Invasion Biology (course responsible since 2020)	Spring 2019-2025
Advanced Ecology (assistant coordinator)	Fall 2018-2024
Evolutionary Ecology (course responsible since 2021)	Fall 2018-2024
Population Biology (lecturer & exercise coordinator)	Fall 2019-2024
Macroecology (lecturer & examiner)	Fall 2017-2024
Conservation Biology (Internal examiner)	Winter 2021-2023

### **PRESENTATIONS**

#### ***Invited seminars***

2026	International Union for the Study of Social Insects (Germany, planned) EMBL Symposium: The cellular mechanics of symbiosis: sensing friend from foe (Germany, planned) Fermentation Group (online) (North Carolina State University, USA)
2025	Danish Technical University: Biological Scaling Symposium Gordon Research Conference in Animal Microbe Symbiosis: Invited Speaker (USA) Vrije Universiteit Amsterdam: Invited Departmental Seminar Speaker (Netherlands) Zoomorphology Symposium, UCPH
2024	Nutrition Meeting, Bonn, Germany (April 2024)
2023	Faculty lunch seminar series, UCPH
2022	Symposium: Nutritional dimensions in social insect evolution and ecology, International Union for the Study of Social Insects, San Diego, USA University of Copenhagen, Department of Biology, Section for Ecology & Evolution
2021	Tupper Seminar, Smithsonian Tropical Research Institute, Panama (delivered online) Symposium: Communal Nutrition, International Union for the Study of Social Insects, Toulouse, France (via Zoom)
2020	Liverpool University, Liverpool, UK (via Zoom) Novo Nordisk Foundation Center for Basic Metabolic Research, UCPH (via Zoom) Okinawa Institute of Science and Technology, Japan

- 2019 Danish Oikos Society, Aarhus, Denmark
- 2018 Lund University, Departmental Seminar, Lund, Sweden  
Tupper Seminar, Smithsonian Tropical Research Institute, Panama  
Centre for Macroecology, Evolution and Climate, UCPH, Denmark  
Symposium: Latest frontiers in the nutritional ecology of social insects, Entomological Society of America, Vancouver, Canada
- 2017 North Carolina State University, Raleigh, USA  
University of Illinois at Urbana-Champaign, Urbana-Champaign, USA  
California State University, Fresno, USA
- 2016 University of Pierre and Marie Curie, Paris, France  
University of Regensburg, Regensburg, Germany  
Symposium: Physiological responses to environmental change, International Congress for Entomology, Orlando, Florida, USA  
Michigan State University, East Lansing, Michigan, USA  
University of Scranton, Pennsylvania, USA  
Jodrell Laboratory, Royal Botanic Gardens, Kew, London
- 2015 Tupper Seminar, Smithsonian Tropical Research Institute, Panama City, Panama  
Institute of Science and Technology, Vienna, Austria  
Centre for Social Evolution, UCPH, Denmark  
Centre for Macroecology, Evolution and Climate, UCPH, Denmark  
University of Oklahoma, Norman, USA  
Universite Paul Sabatier, Toulouse, France  
University of Pierre and Marie Curie, Paris, France
- 2014 Symposium: Nutrition: Behavior and Life History, International Society for Behavioral Ecology, New York
- 2013 Tupper Seminar, Smithsonian Tropical Research Institute, Panama City, Panama  
University of Oklahoma, Norman, Oklahoma  
University of Costa Rica, San Jose: Departmental Seminar
- 2012 Symposium: Social Insects and the emergence of novelty: from local rules to global behaviour. Entomological Society of America, Knoxville, Tennessee  
Gordon Conference Metabolic Ecology, Biddeford, Maine
- 2011 National Evolutionary Synthesis Center, Durham, North Carolina  
North Carolina State University, Raleigh, USA  
Eastern Tennessee State University, Johnson City, USA  
University of Tennessee, Knoxville, USA
- 2010 Smithsonian Tropical Research Institute: Behavior Discussion Group, Panama  
Smithsonian Tropical Research Institute: Bambi Seminar on Barro Colorado Island, Panama  
University of Oklahoma, Norman, Oklahoma
- 2009 Kansas State University, Manhattan, USA  
Departmental retreat of Zoology, Lake Texoma, The University of Oklahoma
- 2008 Gordon Research Seminar: Metabolic Basis of Ecology, Biddeford, Maine. 2008.  
Ecomunch Seminar, University of Oklahoma, Norman, USA
- 2007 Smithsonian Tropical Research Institute: Bambi Seminar on Barro Colorado Island, Panama

### ***Contributed talks at professional meetings***

- Shik JZ (2026, planned) Nutritional niches reveal mutualism resilience mechanisms in urban leafcutter ants. IUSI (Germany)
- Shik, J.Z. & Leal-Dutra C (2024) Nutritional rewards can mediate higher-level homeostasis in a tightly integrated leafcutter ant-fungus cultivar symbiosis. The Cellular Mechanics of Symbiosis Meeting, Heidelberg (Germany)
- Shik, J.Z. (2021) Deconstructing a nutritional symbiosis to explore the rise of fungus-farming ants. European International Union for the Study of Social Insects, Toulouse, France (moved online).
- Shik, J.Z. (2021) British Ecological Society meeting, Liverpool, UK (oral presentation canceled due to COVID).

- Shik, J.Z. (2020) Nutritional niches reveal domestication tradeoffs in fungus-farming ants. International Congress of Entomology (oral presentation canceled due to COVID)
- Shik, J.Z. (2018) Nutritional dimensions in insect-fungus co-evolution. Mini Symposium: Fungal ecology and evolution. Section for Ecology and Evolution, UCPH, Denmark.
- Shik, J.Z., Oms, C.S., Arnan, X., Cerda, X., Boulay, R. (2018) Metabolic temperature sensitivity in ants. International Union for the Study of Social Insects. Florianopolis, Brazil.
- Shik, J.Z., Wcislo, W. T., Boomsma, J.J. (2016) Nutrition mediates the expression of cultivar-farmer conflict in a fungus-growing ant. IUSSI Europe, Helsinki, Finland.
- Shik, J.Z., Wcislo, W. T., Boomsma, J.J. (2016) Transitions in farming performance across the attine phylogeny. Oikos, Turku, Finland, 2016.
- Shik, J.Z., Wcislo, W. T., Boomsma, J.J. (2016) Physiological consequences of social transitions in ants. International Congress of Entomology. Orlando, Florida, USA.
- Shik, J.Z. (2015) Nutritional adaptations in the cultivars grown by fungus-growing ants. Plant-Insect-Microbe Interactions Symposium. UCPH, Denmark.
- Shik, J.Z. (2014) Physiological transitions in farming ants. In the symposium: Nutrition: Behavior and Life History. International Society for Behavioral Ecology, New York, USA.
- Shik, J.Z., Gomez, E., Santos, J.C., Kaspari, M., Boomsma, J.J., Wcislo, W.T. (2014) Physiology and the transition from hunting to farming in ants. International Union for the Study of Social Insects. Cairnes, Australia.
- Shik, J.Z. (2014) The evolutionary ecology of fungus growing ants. Smithsonian Fellows Symposium, Panama City, Panama.
- Shik, J.Z. (2013) Linking the traits of male ants with the ecological demands of diverse mating systems. Association of Tropical Biology and Conservation, San Jose, Costa Rica.
- Shik, J.Z. (2012) Toward a general life history model of the superorganism. In the symposium: Social Insects and the emergence of novelty: from local rules to global behaviour. Entomological Society of America, Knoxville, TN.
- Shik, J.Z., Kay, A.D., Silverman, J. (2012) Energy subsidies from aphid mutualists fuel invasive establishment by Argentine ants. Ecological Society of America, Portland, OR.
- Shik, J.Z. (2012) Towards a comparative physiology of insect societies. The Gordon Research Conference: Metabolic Basis of Ecology, Biddeford, ME.
- Shik, J.Z. (2009) Metabolic scaling links the traits of individual ants to their colonies. Ecological Society of America, Albuquerque, NM.
- Shik, J.Z. (2008) Ant colony size and the scaling of reproductive effort. Ecological Society of America, Milwaukee, WI.
- Shik, J.Z. (2008) The metabolic implications of ant colony size. Gordon Research Seminar: Metabolic Basis of Ecology, Biddeford, ME. 2008.

**Contributed talks (not presented by me)**

- Leal-Dutra CA, Kooij P, **Shik JZ**, Griffith G (planned, 2026) Genome plasticity driven by transposable elements in ant-farmed fungi. SMBE, Denmark.
- Rødsgaard-Jørgensen A, Kokkoris V, **Shik JZ** (2025) Loss of the symbiotic reward structure, gongylidia, with mycelial fragmentation in the fungal cultivar of leafcutter ants, *Leucoagaricus gongylophorus*. European Society for Evolutionary Biology, Spain.
- Leal-Dutra C.A., **Shik J.Z.** (2024) Taming the beast: Insights on lineage-specific genome evolution and signatures of domestication in an ant-fungus symbiosis. Brazilian Mycological Congress, Brazil.
- Leal-Dutra C.A., Yuen L.M., Conlon B.H., **Shik J.Z.** (2022) A domesticated fungal cultivar recycles its cellular contents as nutritional rewards for its leafcutter ant farmers. International Union for the Study of Social Insects (IUSSI) European Society for Evolutionary Biology, Groningen, The Netherlands.
- Leal-Dutra C.A., Yuen L.M., Conlon B.H., **Shik J.Z.** (2022) A domesticated fungal cultivar recycles its cellular contents as nutritional rewards for its leafcutter ant farmers. Gordon Research Seminar in Cellular and Molecular Fungal Biology, New Hampshire, USA.
- Leal-Dutra C.A., Yuen L.M., Conlon B.H., **Shik J.Z.** (2021) A domesticated fungal cultivar

- recycles its cellular contents as nutritional rewards for its leafcutter ant farmers. International Union for the Study of Social Insects (IUSI), North-West Europe Annual Meeting, Online.
- Conlon B.H., **Shik, J.Z.** (2021) Inter-kingdom communication between ants and fungi. Section for Microbial and Chemical Ecology, Department of Biotechnology and Biomedicine, The Technical University of Denmark, Kongens Lyngby, Denmark.
- Conlon, B.H., **Shik, J.Z.** (2020) The key to a good relationship: inter-kingdom communication in a fungal-ant nutritional symbiosis. International Union for the Study of Social Insects (IUSI) North-West Europe Annual Meeting, Online.
- Bolander, M., Andersen J.E., **Shik, J.Z.** (2021) Nutrient flow through the domesticated farming systems of the Panamanian leafcutter ant *Acromyrmex echinator*. NWE-IUSI Winter Meeting, Online.
- Crumiere, A., **Shik, J.Z.** (2019) Nutritional provisioning of fungal cultivars by leafcutter ants. European Society of Evolutionary Biology, Turku Finland.
- Pedersen J.S., Krabbe, B.A., **Shik, J.Z.** (2018) Pharaoh ant workers regulate nutrition to prioritize colony growth over individual survival. International Union for the Study of Social Insects. Florianopolis, Brazil.
- Kooij, P.W., Gaya, E., **Shik, J.Z.**, Dentinger, B.T.M. (2017) On the origin of mutualisms: where did fungus farming in ants begin? European Society of Evolutionary Biology, Groningen, The Netherlands.
- Kooij, P.W., Gaya, E., **Shik, J.Z.**, Dentinger, B.T.M. (2016) On the origin of mutualisms. 8th Brazilian Congress for Mycology, Florianopolis, Brazil.
- Kooij, P.W., **Shik, J.Z.**, Gomez, E., Wcislo, W., Boomsma, J.J. (2014) Fast-growing fungal crops grown by the ant *Trachymyrmex cornetzi* appear more resistant to the fungal pathogen. *Escovopsis*. Northwest European Society for the Study of Social Insects, London, UK.
- Silverman, J., **Shik, J.Z.**, Schal, C. (2012) Nutrient regulation and post-ingestive utilization in glucose averse German cockroaches. Entomological Society of America, Knoxville, Tennessee, USA.
- Kay, A.D., **Shik, J.Z.**, Van Alst, A., Miller, K.A., Kaspari, M. (2011) Diet composition does not affect ant colony tempo. Entomological Society of America, Reno, Nevada, USA.

### **Poster presentations**

- Stelate A, **Shik JZ** (planned, 2026) A novel functional cell biology platform for the fungal symbiont domesticated by leafcutter ants. GRC in Fungal Genetics, USA.
- de Santana SF, Leal-Dutra C.A., Fonseca PLC, **Shik J.Z.**, Aguiar ERGR (2025) Characterization of RNAi core genes and its small RNA products in the fungus domesticated by leafcutter ants. International Mycological Congress, Maastricht, Netherlands.
- de Santana SF, Leal-Dutra CA, Olmo RP, Fonseca PLC, **Shik JZ**, Aguiar ERGR (2024) Micovírus que habitam o cultivo fúngico de formigas-cortadeiras desencadeiam respostas imunológicas de RNAi em seu hospedeiro. Brazilian North and Northeast Bioinformatics Symposium, Brazil.
- de Santana SF, Leal-Dutra CA, Olmo RP, Fonseca PLC, **Shik JZ**, Aguiar ERGR (2024) Mycoviruses inhabiting the fungal cultivar of leafcutter ants elicit defensive RNAi immune responses in their fungal host. 35<sup>th</sup> Brazilian Virology Congress, Brazil.
- Rødsgaard-Jørgensen A, Leal-Dutra C, Stelate A, **Shik JZ** (2024) The genomic structure of the domesticated multinucleate fungus farmed by leafcutter ants. Gordon Research Conference in Cellular and Molecular Fungal Biology, New Hampshire, USA.
- Leal-Dutra C, Vizueta J, Baril T, Kooij PW, Rødsgaard-Jørgensen A, Conlon BH, Croll D, **Shik JZ** (2024) Insights on lineage-specific genome evolution and signatures of domestication in an ant-fungus symbiosis, International Mycological Congress, Maastricht, Netherlands
- de Santana SF, Leal-Dutra CA, Olmo RP, Fonseca PLC, **Shik JZ**, Aguiar ERGR (2024) Characterization of RNAi core genes and its small RNA products in the fungus domesticated by leafcutter ants. International Mycological Congress, Maastricht, Netherlands. [Best Poster award from BMC]
- Kooij PW, Dentiger B, **Shik JZ**, Gaya E (2024) Resolving taxonomic relationships between free-living and symbiotic fungi. International Mycological Congress, Maastricht, Netherlands
- Schmidt S, Bille BJ, Vissing FK, Kock CS, Gaal KM, Sørensen C, Kochanowski M, Kolotchéléma Silue S,

- Koné NA, **Shik JZ**, Rosendahl S, Poulsen M (2024) What can we learn from termites about fungal cultivation? Annual Congress of the Danish Microbiological Society (DMS), Copenhagen, Denmark.
- Leal-Dutra CA, Yuen LM, Conlon BH, **Shik JZ** (2022) Gordon Research Conference in Cellular and Molecular Fungal Biology, New Hampshire, USA
- De Fine Licht HH, Csontos Z, Hansen AKK, Nielse PJDN, Langkilde EB, **Shik JZ** (2022) Host specificity influences how fungal pathogens navigate nutritional landscapes of their insect hosts. European Society for Evolutionary Biology, Prague, Czech Republic.
- Conlon, B.H., **Shik, J.Z.** (2021) The key to a good relationship: inter-kingdom communication in a fungus-ant nutritional symbiosis. Annual Congress of the Danish Microbiological Society (DMS), Copenhagen, Denmark.
- Leal-Dutra C.A., Yuen L.M., Conlon B.H., **Shik J.Z.** (2021) A domesticated fungal cultivar recycles its cellular contents as nutritional rewards for its leafcutter ant farmers. Annual Congress of the Danish Microbiological Society (DMS), Copenhagen, Denmark.
- Contreras Serrano, M., Conlon, B., **Shik, J.Z.** (2020) Resiliency to plant toxins in domesticated fungal cultivars of leafcutter ants. International Union for the Study of Social Insects, NW Europe meeting, Online.
- Bolander, M., Elmgaard Andersen, J., Crumiere, A., **Shik, J.Z.** (2020) Gardening behaviors in leafcutter ants. International Union for the Study of Social Insects, NW Europe meeting, Online.
- Oberweiser, M., Beres, Z., **Shik, J.Z.**, Adams, R.M.M. (2017) Unraveling a Panamanian caterpillar/ant mutualism. Ohio State University Student Research Symposium, Columbus, USA.
- Mularo, A.J., **Shik, J.Z.**, Adams, R.M.M. (2017) Dynamics of pseudoscorpions in a neotropical rainforest. Ohio State University Student Research Symposium, Columbus, USA.
- Rytter, W., Michelsen, A., **Shik, J.Z.** (2016) Tracing the flow of nutrients through the complex symbiotic network of the leafcutter ant *Atta colombica* using stable isotopes. IUSI Europe, Helsinki, Finland.
- Rytter, W., **Shik, J.Z.** (2016) The leafcutter lunchbox: linking digestive physiology and foraging behavior of four Panamanian leafcutter ant species. Oikos, Turku, Finland.
- Wall, B.M., Jones, T.H., **Shik, J.Z.**, Adams, R.M.M. (2015) Evolution of alarm signals: a comparative study of exocrine gland chemistry in attine ants with a special focus on alarm pheromones. International Society of Chemical Ecology, Stockholm, Sweden.
- Shik, J.Z.**, Gomez, E., Wcislo, W.T., Boomsma, J.J. (2015) Nutrition mediates cultivar-farmer conflict in a primitive fungus-growing ant. European Society for Evolutionary Biology, Lausanne, Switzerland.
- Shik, J.Z.** (2010) Using metabolic scaling to examine how ant colonies work: the case of *Pheidole* majors. The International Union for the Study of Social Insects, Copenhagen, Denmark.

### ***Symposium organizer***

- 2023 International Symposium on Social Evolution, over 80 attendees, attained Carlsberg funding
- 2018 *Social insect eco-physiology across scales*, International Union for the Study of Social Insects (every 4<sup>th</sup> year), Guarujá, Brazil (Co-organized)
- 2016 *Physiological responses to environmental change*, International Congress for Entomology (every 4<sup>th</sup> year), Orlando, Florida, USA (Co-organized)

### **OUTREACH ACTIVITIES**

#### ***Consulting and presentations***

- 2025 Presentation to > 100 people from the general public at the Fungus Festival, hosted by UCPH
- 2024 Presentation to > 100 people from the general public at the Fungus Festival, hosted by UCPH
- 2022 Interviewed by TV2 about ERC-funded research
- 2021-present Consulting with the Copenhagen Zoo, Advised on the establishment and maintenance of a leafcutter ant colony in the permanent exhibit

- 2021-2023 Consultant for the National Geographic Documentary “Queens” about the natural history of leafcutter ant queens
- 2020 Blog post for International Union for the Study of Social Insects NW Europe, monthly newsletter
- 2018 Panelist and speaker in ERC Starting Grant information meeting at UCPH
- 2014-present Culture Night, an annual Friday evening event mid-October, for which I organized the social insect booth, Copenhagen, Denmark
- 2016 Consulted with the Copenhagen Zoo on a new exhibit on ecology and evolutionary biology and a new leafcutter ant husbandry project
- 2015 Collaborated with Professors Jacobus Boomsma and Christian Peeters, and artist Naret Phansua on educational cartoon titled ‘*The fungus growing ants: from simple gardening to industrial farming*’. This movie was shown in natural history museums in France and is planned to be used in Denmark as well.
- 2013 Association for Biology Laboratory Education, led symposium participants in a field and lab exercise about ants. Durham, North Carolina, USA.
- 2012 Talk at high school: The North Carolina School of Science and Mathematics, ‘*The Social Insects*’. Raleigh, North Carolina, USA.
- 2010 Panel on ‘*Careers in the Biological Sciences*’, Graduate student representative, The University of Oklahoma, Norman, USA.
- 2010 Darwin Day lecture for the lay public, ‘*The evolution of eusociality*’, The University of Oklahoma, Norman, USA.

### ***In the media***

- 2024 CORDIScovery podcast, ‘Hidden communication’ through the European Research Commission
- 2023 Articles about recent papers from my research group in Carlsbergfond Magazine, Horizon website, Cordis website
- 2021 Coverage of 2021 Ecology Letters paper by ERC commission (interview and video for general audience)
- 2020 Media coverage of my 2020 paper in *Nature Ecology and Evolution*, Altmetric score: 97<sup>th</sup> percentile (ranked 7,844<sup>th</sup>) of 381,140 tracked articles
- Article by the European Research Council in the ‘research stories’ section of their website
  - TV2 News televised Interview show
  - Weekendavisen (Danish newspaper) “*Hvis Jens Hansen var en myre*”
  - Smithsonian Institution Newsletter “*The Darwinian diet: you are what you eat*”
  - COSMOS magazine
  - The Statesman (Indian newspaper)
  - Press release covered by: Phys.org, EurekAlert, ScienMag, AZO Life Sciences, Iflscience
- 2017 Coverage of my ERC Starting Grant
- Magisterbladet (Danish newspaper) “*Myrer er dygtige landmænd*”
- 2016 Media coverage of my 2016 paper in *Proceedings of the National Academy of Sciences*, Altmetric score: 97<sup>th</sup> percentile
- Weekendavisen (Danish newspaper) “*Med gødning skal svampen tæmmes*”
  - Videnskab.dk (Danish magazine)
- 2016 Media coverage of my 2016 paper in *Animal Behaviour*
- Australia’s Science Channel “*Do ant farmers forage with a lunchbox?*”
- 2014 Smithsonian Institution Newsletter “*How much energy is needed to farm fungus?*”
- 2012 Media coverage of my 2012 paper in *Biology Letters*
- ScienceDaily.com “*Research predicts growth, survival of ‘superorganism’ ant colonies*”

**OTHER ACADEMIC EXPERIENCES**

- Workshops* Ant Biodiversity Data Synthesis Meeting, Okinawa Institute of Technology, Japan (2019)  
DNA barcoding meeting, Diversity in a Panamanian fungus growing ant community, UCPH, Denmark (2017)
- Courses* Respirometry Course, Sable Systems International, Berlin, Germany (2013)
- since PhD* Respirometry Course, Sable Systems International, Las Vegas, NV (2008)  
Soil Acarology Course, The Ohio State University Acarology Laboratory, Columbus, OH, USA (2006)  
The Ant Course, California Academy of Sciences & Harvard University Museum of Comparative Zoology, Portal, AZ (2005)
- Memberships* European Society for Evolutionary Biology  
International Union for the Study of Social Insects  
British Ecological Society  
Danish Oikos Society