Curriculum vitae

Personal data:

Name: Univ.-Prof. Mag. Dr. Thomas Schmickl
Date of birth: 20.10.1969 in Graz (Austria)
Citizenship: Austria
Family status: married, 3 children

Contact points:

Personal homepage:	https://www.thomasschmickl.eu
Research Gate profile:	https://www.researchgate.net/profile/Thomas-Schmickl
Google scholar profile:	https://scholar.google.com/citations?user=2kt2WucAAAAJ
ORCID profile:	https://orcid.org/0000-0001-8598-7462
LOOP profile:	https://loop.frontiersin.org/people/112419/overview
Lab homepage:	https://alife.uni-graz.at
Lab Facebook:	https://www.facebook.com/artificiallifelab
Lab Youtube:	https://www.youtube.com/user/IZGartlife
COLIBRI homepgae	https://colibri.uni-graz.at
University research portal page:	https://online.uni-graz.at/kfu_online/wbforschungsportal.cbshowportal?pPersonNr=50874
Department website:	https://biologie.uni-graz.at/en/metabolism-behavior-and-artificial-life/research/artificial-life/

Main Academic Trajectory:

2012: Habilitation "*The Collective Physiology of the Swarm: Modelling Self-Organization, Self-Regulation and Swarm-Intelligence of Distributed Systems in Biology and Bio-Robotics*".

1999 - June 2001: Doctorate in Zoology at the University of Graz, Austria, passed with distinction. Ph.-D. thesis: "*Regulation of brood development in the honeybee (Apis mellifera L.): Feedback mechanisms and survival strategies of a superorganism*".

1989-1998: Master of Biology (Zoology & Biochemistry) at the University of Salzburg, Austria, passed with distinction. Master thesis: "*Die Erfassung des mikrobiologischen Status in der Innenraumluft von Krankenanstalten*".

Positions:

Since Oct. 2016: Full Professor at the Department for Zoology, Karl-Franzens-University Graz Austria, supervising three labs with a total head count of 40+ employees: The honeybee and wasp physiology lab, the animal behaviour lab and the Artitficial Life Lab

Since Jan 2019: Founder and head of the research cluster "COLIBRI" (Complexity of Life in Basic Research and Innovation), a joint initiative of 22 professors and (and their associated workgroups) and 8+ Senior-PostDoc run groups at the university that join forces to intensify their research with focus on studying Complex Systems. This is the first step towards creating an "Institute for Complexity Research" at the University.

Jan. 2013-Oct. 2016: Associate Professor at the Department for Zoology, Karl-Franzens-University Graz, Austria, head of the Artificial Life Lab

June 2012-Dec. 2012: Professorship as "Basler Chair of Excellence" at the East-Tennessee State University (ETSU), in Johnson City, TN, U.S.A.

Oct. 2007-June 2012: Full-time assistant professor (faculty position) at the Department for Zoology, Karl-Franzens-University Graz, Austria, head of the Artificial Life Lab.

Sept. 2007- Mar. 2013: Lecturer at the University of Applied Sciences St. Pölten (Austria) in the course of studies "SimCom" (Computational Simulation, 1 month per semester).

Jan. 2007 – Aug. 2007: Visiting Professor at the East Tennessee State University (Johnson City, USA), Biological Department in the program SYMBIOSIS, granted by the Howard Hughes Medical Institute (8 months).

Feb. 2006 - Feb. 2007: Assistant Professor at the Department for Zoology, Karl-Franzens-University Graz (1 year).

Mar. 2004 – Dec. 2006: Lecturer at the Karl-Franzens-University Graz in the course of study "Biology" as side-duty of my university contract.

Jan. 2004 – Feb. 2007: Post-Doc-position in the EU-funded project "Intelligent Small World Autonomous Robots for Micro-manipulation" EU IST-FET-open project (IP) 'I-SWARM', no. 507006.

Oct. 2003 – Dec. 2006: Lecturer at the Karl-Franzens-University Graz in the course of study "Sciences of Environmental Systems".

Mar. 2003 – July 2006: Lecturer at the University of Applied Sciences St. Pölten (Austria) in the course of studies "SimCom" (Computational Simulation).

Mar. 2003 – Feb. 2004: External lecturer at the Karl-Franzens-University Graz in the course of study "Biology".

Feb. 2003 – Jan. 2004: Post-Doc-position in the FWF-funded (Austrian Science Foundation) project "Self-Organization of working bees on a honeybee comb: Investigating and modeling the spatial distribution, regulation of tasks, working effort, communication of colony state and sharing of a collective memory among working honeybees", Project-Nr.: P 15961-B06.

Sept. 2002 – Jan. 2003: Lecturer at the University of Applied Sciences St. Pölten (Austria) in the course of studies "SimCom" (Computational Simulation), teaching Biological Modelling and Simulation, Self-Organization of Biological Systems and Swarm-Intelligence (4 months).

Mar. 2002 – Jul. 2002: External lecturer at the Karl-Franzens-University Graz in the course of study "Biology".

Aug. 2001 – Jan. 2002: Scientific assistant (6 months) for studies of social insects (FWF-funded position).

Feb. 2001 – Jul. 2001: Guest professorship (6 months) at the Karl-Franzens-University Graz.

Sept. 2000: Programmer for developing a database application and a statistical analysis tool for corporate data at the company "Foto Schmickl" in Graz (1 month)

Mar. 2000 – Mai 2000: Guest professorship (3 months) at the Karl-Franzens-University Graz.

1999: "Contract for labour" ("Werkvertrag") to program a literature database for the Department for Zoology, Graz.

1998: 1 year of "civil service" (instead of obligatory military service in Austria) at the Red Cross, Graz.

1996 - 1997: Software developer at the company "progressive software design" in Graz (15 months).

1995: Programmer for contract work at the company "grafomed" (Software Development) in Vienna (4 months)

1994: Employment as a member of the "production team" in a professional movie production of SATEL film for the Austrian Broadcasting Corporation (ORF, 2 months)

Additional Scientific Qualifications:

2008: 6 days of intensive training in "robot microcontroller programming" (with µC-compiler) and "micro-robot assembly" at Dr. Kornienko, at the Institute for Parallel and Distributed Systems (IPVS), Stuttgart, Germany. (18.1.-23.1. 2008)

2006: 5 days of intensive training in "robot microcontroller programming" (with µC-compiler) and "micro-robot assembly" at Dr. Kornienko, at the Institute for Parallel and Distributed Systems (IPVS), Stuttgart, Germany. (16.6.-20.6.06)

2002: Summer school at the European Forum Alpbach (Austria), granted by the "Club Alpbach Graz". I applied to 2 courses: "Gaia-Theory: The earth as bio-geo-ecosystem" (by W. Wieser and S. Franck) and "Networks in Evolution" (by E. Szathmary and E. Jablonka).

1999: Study visit ("stage") at the "Unité de Génétique Moléculaire Bactérienne de l'Institut Pasteur", Paris.

1998 – 2001: Foundation of my project ‘e:doc’, an open-source, multi-platform front-end for LaTeX, written in Perl/Tk, which was well renown in the Linux community and in the Perl/Tk community.

1998: "Certificate of Excellence" from Microsoft as "Microsoft Certified Professional".

1997: "PC User" and "PC Administrator".

1996: "On-the-job training” in Delphi und Interbase by Borland International.

Grants, awards, sponsorships and scholarships:

2024: Our EU project RoboRoyale won the 6th Edge of Government Award in the category “Changing Perspectives” at the World Government Summit in Dubai. Awarded by the Prime Minister of the United Arab Emirates (UAE).

2024-2029: Grant acquisition and Principal Investigator (P.I.) of the project “SensorBees”. European Union EIC Pathfinder Open; total funding: € 3,197,502.50; individual contribution for Uni Graz: € 945,633.75; Grant Agreement ID: 101130325; 2024-2029.

2023: “Article of the year 2022” award by the journal “Complexity” for the article “Strong emergence arising from weak emergence”. https://doi.org/10.1155/2022/9956885

2022: Best symposium paper award at ICSA 2022 (International Conference for Structures and Architecture) for the article „A study model for reconstructing urban ecological niches“.

2021: “Prix Agathon de Potter de Biologie Animale” for the best nominated work in the year 2020 in the field of Zoology, awarded by the Royal Academy of Science, Letters and Fine Arts of Belgium.

2021-2026: Grant acquisition and Principal Investigator (P.I.) of the project “RoboRoyale”: European Union FET-PROACT (Excellent Science pillar) Horizon 2020; total funding: € 3,269,938.75; individual contribution for Uni Graz: € 1,170,786.25; Grant agreement ID: 964492

2020: Co-P.I. and co-coordinator (leading P.I. and coordinator: Dr. Ronald Thenius) of the EU funded FET project “ROBOCOENOSIS” (total funding is € 3.0 Mio, of which approx. 865 k€ are funding of the University of Graz). Grant agreement ID: 899520.

2019: The work of the EU project Hiveopolis, which is coordinated by me, was awarded the Distributed Design Award by Vienna Design Week and Maker Faire for the exhibition of the Hiveopolis smart beehive materials and prototypes at Vienna Maker Faire.

2019-2024: Grant acquisition, Project Coordinator (P.C.) and Principle Investigator (P.I.) of the project “HIVEOPOLIS”. European Union FET-PROACT (Excellent Science pillar) Horizon 2020; total funding: € 6,999,508.75; individual contribution for Uni Graz € 1,732,558.75; Grant agreement ID: 824069.

2019-2020: Grant acquisition and Principle Investigator (P.I.) of the project “Atempgrad”. European Union FET-LAUNCHPAD Horizon 2020; funding € 99,737.50; Grant agreement ID: 850877.

2015-2019: Grant acquisition and Project Coordinator (P.C.) and Principal Investigator (P.I.) of the project "subCULTron". European Union FET-PROACT (Excellent Science pillar) Horizon 2020, total funding € 3,987,650.75; individual contribution for Uni Graz: € 901,300.00; Grant agreement ID: 640967.

2018: Teaching Award „Lehre: Ausgezeichnet!" ("Teaching: Excellent!") at the University of Graz, Austria (10/2018). This award is given to the lecturers of the best courses of the study year.

2017: Best paper award at IEEE SSCI Symposium on Artificial Life, Honolulu, USA (12/2017) for the article "Governing the swarm: Controlling a bio-hybrid society of bees & robots with computational feedback loops".

2017: Best paper award at the 10th EAI International Conference on Bio-inspired Information and Communications Technologies (BICT), New Jersey, USA (03/2017) for the article "Robotic oligarchy: how a few members can control their whole society by doing almost nothing".

2015-2019: Grant acquisition and Principal Investigator (P.I.) in the project "Flora Robotica": European Union FET-PROACT (Excellent Science pillar) Horizon 2020; total funding: € 3,641,782.50; individual contribution for Uni Graz: € 608,445.--; project-no. 640959.

2015: Grant acquisition and Supervisor in the small-scale, small-term project "vibration experiments", funded by the FFG with € 1,000.-- in the funding program "young talents".

2015: Grant acquisition and Supervisor in the small-scale, small-term project "robotic experiments 4", funded by the FFG with € 1,000.-- in the funding program "young talents".

2014: Grant acquisition and Supervisor in the small-scale, small-term project "robotic experiments 3", funded by the FFG with € 1,000.-- in the funding program "young talents".

2013: Grant acquisition and Supervisor in the small-scale, small-term project "shoaling behaviour", funded by the FFG with € 1,000.-- in the funding program "young talents".

2013: Grant acquisition and Supervisor in the small-scale, small-term project "temperature organ", funded by the FFG with € 1,000.-- in the funding program "young talents".

2013: Grant acquisition and Supervisor in the small-scale, small-term project "wall following behaviour", funded by the FFG with € 1,000.-- in the funding program "young talents".

2013-2018: Grant acquisition and Project Coordinator (P.C.) and Principal Investigator (P.I.) of the project "ASSISI_bf". European Union FP7-IP (FET); total funding € 7,649,939.--; individual contribution for Uni Graz: € 2,166,280.--; project-no. 601074. Finished with the final assessment "excellent" by the reviewer panel.

2014: Science-Award by the Government of the State of Styria 2013 in "Simulation & Modeling" in the subject "Basic research".

2012: Grant acquisition and Supervisor in the small-scale, small-term project "robotic experiments 2", funded by the FFG with € 1,000.-- in the funding program "young talents".

2012: Grant acquisition and Supervisor in the small-scale, small-term project "behavioural analysis – part 2", funded by the FFG with € 1,000.-- in the funding program "young talents".

2012: Grant acquisition and Supervisor in the small-scale, small-term project “behavioural analysis – part 1”, funded by the FFG with € 1,000.-- in the funding program “young talents”.

2012-2014: Grant acquisition and Principal investigator of the FWF-funded project REBODIMENT (funding € 270,500.--), project-no. P23943-N13

2012: Mentoring award from the Ministry of Transport, Innovation and Technology (Ms. Doris Bures) for the FFG funded small-scale project “young talents” with the mentored student T. Kunzfeld.

2012: Visiting-professorship as “Chair of Excellence for the Integration of the Arts, Rhetoric, and Science” at the East-Tennessee State University (ETSU), in Johnson City, TN, USA (6.5 months, funded US-$ 65.800,-- by the Wayne G. Basler foundation)

2011: Grant acquisition and Supervisor in the small-scale, small-term project “robot experiments”, funded by the FFG with € 1,000.-- in the funding program “young talents”.

2011-2014: Grant acquisition and Project Coordinator (P.C.) and Principal Investigator (P.I.) of the project “CoCoRo”. European Union FP7-ICT; total funding: € 3 755 902,00; individual funding for Uni Graz: € 810,420.--; project-no. 270382. Finished with the final assessment “excellent” by the reviewer panel.

2010: Grant for Initiation financing for the proposal to the EU project CoCoRo. Funded with € 7.500,-- by the 'FFG: Forschungsförderungsgesellschaft', Austria.

2009-2013: Grant acquisition for front-end financing ('Zusatzfinanzierung') for the EU-FP7 project "Symbrion" - Symbiotic Evolutionary Robot Organisms. Funded with € 38.700,00 by the 'Bundesministerium für Wissenschaft und Forschung', Austria.

2009-2013: Grant acquisition for front-end financing ('Zusatzfinanzierung') for the EU-FP7 project "Replicator". Funded with € 49.106,70 by the 'Bundesministerium für Wissenschaft und Forschung', Austria.

2009: Grant for initiation financing for the proposal to the EU project MEDUSAS. Funded with € 15.000,-- by the 'FFG: Forschungsförderungsgesellschaft', Austria.

2008-2013: Grant acquisition and Principal Investigator (P.I.) of the project “Symbrion”: European Union FP7-ICT (FET); total funding € 7,452,801.--; individual funding for Uni Graz: € 536,000.--; project-no. 216342.

2008-2012: Grant acquisition and Principal Investigator (P.I.) of the project “Replicator”: European Union FP7-ICT; total funding € 7,056,633.--; individual funding for Uni Graz: € 632,040.--; project-no. 216240.

2007-2010: Grant acquisition and Principal Investigator (P.I.) of the FWF-project “Temperature-induced aggregation of young honeybees: Individual behaviour vs. collective behaviour” (funded € 170.000,-- by the Austrian Science Foundation).

2007: “Visiting Professor” at the East Tennessee State University (8 months, funded US-$ 30.800,-- by the program SYMBIOSIS, granted by the Howard Hughes Medical Institute).

2006: Granted € 3600,-- from the museum “Haus der Wissenschaften” to establish a robotic swarm installation.

2003: Scholarship for visiting the "European Forum Alpbach 2003" granted by the "IV" ("Industry Association of Austria").

2002: Scholarship for visiting the "European Forum Alpbach 2002" granted by the "IV" ("Industry Association of Austria").

2001: 6 month guest professorship (topic: bioinformatics, biomodelling) at the Karl-Franzens-University Graz (funded € 24.000,-- by the University of Graz).

2000: 3 month guest-professorship (topic: bioinformatics, biomodelling) at the Karl-Franzens-University Graz (funded € 12.000,-- by the University of Graz).

1999: Travel scholarship for presentation at the "APIMONDIA conference" in Vancouver, Canada, granted by the Major of Graz, Austria.

1999: Travel scholarship for presentation at the "APIMONDIA conference" in Vancouver, Canada, granted by the Styrian Governor.

1985: Awarded by the "Silver Diploma" for excellent results in the "Akademisches Gymnasium", Graz, by the Styrian Governor.

Breaks in education:

1999-2000: One year of "paternity leave".

1998-1999: One year of civil services at the Austrian "Red Cross" (obligatory in Austria).

Reviewing:

I review articles for the following journals and books/scientific series:

- ACM Transactions on Autonomous and Adaptive Systems
- Acta Biotheoretica
- Adaptive Behavior
- Advances in Complex Systems
- Apiacta
- Apidologie
- Artificial Life
- Artificial Intelligence
- Bulletin of Mathematical Biology
- Ecological Modelling
- Engineering Applications of Artificial Intelligence
- Genetic Programming and Evolvable Machines
- Mathematical and Computer Modelling of Dynamical Systems
- Nature Physics
- Naturwissenschaften
- Neural Computing and Applications
- PLOS One
- Proceedings of the Royal Society B
- Proceedings of the Royal Society Interface
- Robotica
- Robotics
- Science
- Science Robotics
- Scientific Reports
- Springer Swarm Intelligence

▲ IEEE Transactions on Robotics ▲ Insectes Sociaux ▲ Insect Science ▲ Intelligent Service Robotics ▲ International Journal of Innovative Computing and Applications ▲ Journal of Economic Entomology ▲ Journal of Insect Behavior ▲ Journal of Theoretical Biology	▲ Springer book "Symbiotic multi-robot organisms" (eds. Dr. S. Kernbach, Prof. P. Levi) ▲ Theoretical Biology ▲ Theoretical Population Biology ▲ Transactions on Evolutionary Computation ▲ Transactions on Robotics

I act in program committees & scientific boards of conferences on a frequent basis:

▲ ACVRW 2020 ▲ ALIA 2016 ▲ ALIFE (always) ▲ ANTS (always) ▲ ARW 2012 ▲ AWARE 2011 ▲ BICT (always) ▲ BIONETICS ▲ BIOROB 2012 ▲ CCS 2019 ▲ CoSMoS 2015 ▲ CSI 2017 ▲ DARS (often) ▲ EAIS 2017 ▲ ECAI (often) ▲ ECTA (always) ▲ ECAL (always) ▲ EURBEE 2008 ▲ EvoApps (always) ▲ EvoRobot (often)	▲ EvoStar (often) ▲ FAS 2018 ▲ GECCO (always) ▲ GCAI 2017 ▲ ICARIS 2010 ▲ ICRA 2016 ▲ IEE CEC 2009 ▲ IEEE CIS 2017 ▲ IEEE ALIFE (often) ▲ IEEE SSCI (often) ▲ IROS (multiple times) ▲ LIAR 2017 ▲ Living Machines (always) ▲ MATHMOD (often) ▲ MESROB 2016 ▲ PRIMA 2015 ▲ SASO (often) ▲ SWARMFEST 2017 ▲ TAROS (often) ▲ TEVC 2013

European-level reviewing and consulting:

2019: Reviewer of the EU FET-Open project PHOENIX at the yearly review meeting of the project in Eindhoven, Netherlands

2018: Reviewer of the EU FET-Open project PHOENIX at the yearly review meeting of the project in Eindhoven, Netherlands

2016: Evaluator for EU grant proposals in the call FET PROACTIVE: emerging themes and communities

2011: Reviewer for grant proposals for the Swiss National Science Foundation (SNSF)

2011: Advisory board of AWARENESS, an EU-funded Coordination Action (FP7)

2011: Member of the consultation board in the EU-FET-Proactive consultation "Living technologies", 10.11.2011, invitation by Dargmar Floeck. Leading to the calls FOCAS and ELEVIT

2011: Reviewer for the call FP7-ENV-2011-2.1.4-2 "Behaviour of ecosystems, thresholds and tipping points"

2011: Reviewer for the call FP7-ICT-2011-7 – ICT – Information and Communication Technologies - "Cognitive Systems and Robotics"

2011: Consultation of Rothamsted Research & SYNGENTA in the UK-national project "Honeybee population dynamics: Integrating the effects of factors within the hive and in the landscape" on honeybee population modelling and honeybee behavioural modelling (2.11.2011, Bracknell, UK)

2010: Consultant at the workshop "EVOBODY - New Principles of Unbound Embodied Evolution" in Malta, 23rd Sept. 2010.

2009: Consultant at the EU FET proactive external consultation workshop "Fundamentals of collective adaptive systems". 3.-4. November 2009, Leuven, Belgium.

Organizing summer/winter schools or similar activities:

2024: Hiveopolis Winter School "Winter School on Modelling and measuring Biohybrid Multi-Level Complex Systems". 20th to 23d of February 2024, in Graz. Organized in cooperation with Arqus, COLIBRI, and the EU projects RoboRoyale and Watchplant.

2022: Co-organizing the COLIBRI track in the combined Hackathon "Change" and the "Brain, Behavior & Society" Springschool at the University of Graz, 8th of April.

2021: Organizing the track "Bio-inspired & Bio-mimetic Algorithms" at the "Virtual Vehicle Summer School 2021 – Beyond A.I." in Graz, 13.-15.9.2021 together with TU Graz and the Virtual Vehicle cluster.

2017: Assisi_bf Summer School 2017 - "Engineering and Evolution of Bio-Hybrid Societies", Graz, Austria 29 th – 31 th - August 2017, at the Karl-Franzens-Universität Graz Organizer: Thomas Schmickl & Martina Szopek

2016: Assisi_bf Winter School 2016 - "From bio-inspired to bio-hybrid (robotic) systems", Lausanne, Swizerland 12 th – 14 th January 2016, at the Ecole Polytechnique Fédérale de Lausanne Organizer: Francesco Mondada & Thomas Schmickl

Organization & co-organization of scientific symposiums and meetings:

2024: Symposium "Biohybrids through Organism-Technology-Interactions – Models, Methods, Potentials, Epistemology & Ethics" as a COLIBRI Focus Workshop. 18th-19th of February 2024 in Graz.

2023: Symposium "Bioinspired Engineering, Soft Robotics and Bio-Hybrid Technologies as New Frontiers in Sustainable Agriculture and Environmental Management" at the 2023 IEEE International Workshop on Metrology for Agriculture and Forestry (MetroAgriFor 2023), together with Dr. Donato Romano.

2022: Special Session "Workshop on Animal-Robot Interaction" at the 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022) in Kyoto, Japan, October 23rd to Oct 27th, together with Dr. Donato Romano and Prof. Cesare Stefanini.

2021: Special Session "Complexity ALI[F|V]E: Socializing & Eco-integrating robots with living organisms" at the ALIFE 2021 Konference in Prague, Czech Republic. Organized together with Dr. Donato Romano, Dr. Ronald Thenius and Prof. Martin Grube.

2015: Workshop "Bioinspired Underwater Robotics" 2015, Hamburg, Germany, 02nd October 2015 at IROS 2015 Organizer: Cesare Stefanini & Thomas Schmickl

2015: Symposium "Social Behaviour and Self-Regulation in Insects, Swarms and Algorithms" 2015, Graz, Austria, 08th September 2015 at DZG Organizer: Thomas Schmickl & Martina Szopek.

2014: Symposium **"**Emergent social behaviours in bio-hybrid systems" at Living Machines 2014, Milano, Italy, 30th July – 1st August 2014 with Stuart Wilson & Jose Halloy

2013: Symposium **"**Emergent social behaviours in bio-hybrid systems" at Living Machines 2013, London, UK, 29th July - 2rd August 2013 with Stuart Wilson & Jose Halloy

2012: Symposium "Honeybee colony organization: from empirical studies to modeling approaches and technical applications" at the EURBEE 2012 (together with Dr. Matthias Becher)

2011: Special Session "Self-adaptive and self-aware multi-component systems" at BIONETICS 2011 (together with Dr. Ronald Thenius)

2009: Workshop "Agent connectivity: the role of cooperation in the regulation of the behavior of animals and robots" at ECAL 2009, Budapest, 13th - 16th September 2009. Organized together with Prof. Istvan Karsai, ETSU, USA.

2009: Symposium "Modeling the swarm" at MATHMOD 2009, Vienna 11th -13th February. Organized together with Dr. Heiko Hamann, University of Karlsruhe.

2005: Co-Organizing the symposium "Optimization and regulation of work in social insects" on the Third European Congress on Social Insects (IUSSI), St. Petersburg State University, 22nd to 27th of August 2005.

2005: "I-SWARM"-workshop at the EURON conference, February 16th - 18th 2005; Warszaw, Poland.

2004: Workshop "Modeling of biological swarms". Participants: Scientists from universities in: Stuttgart (D), Karlsruhe (D), St. Ingbert (D), Lausanne (CH), Sheffield (UK), Kanpur (India) and Pisa (I), on May 7th, 2004, Graz, Austria.

Invited talks/Plenary lectures/Keynotes:

2024: "Digital technology as a contingency for ecosystem decay", at the Helex Annual Meeting 2024, Graz, Austria, 15th of October 2024, invitation by the organizing team.

2024: "Strong Emergence Arising from Weak Emergence", Complexity of Life Conference 2024, Graz. 24. September 2024, invitation by the organizing team.

2024: "Biohybrid Honeybee Hives for Research and Application", Workshop "Nature Unleashed" at 2024 10th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob), Heidelberg, Germany, 1st September 2024, invitation by Gianluca Manduca and Cesare Stefanini

2024: "Studying Complex Honeybee Behaviours with the Help of Robots". Robosoft 2024, San Diego, USA. 14th of April 2024 in the symposium "Bio-Hybrids: When Robots Come Aalive", invitation by Prof. Miriam Filippi, ETH Zurich, CH.

2024: "Robotics as an Eco-Effective Contingency for Weakened Ecosystems?" 11th of April 2024, invitation by Prof. Wi-Min Shen, University of Southern California, Los Angeles, USA.

2024: "Can Robots Save Nature? How Robotics, AI, and Big Data can be a Contingency for Decaying Ecosystems". 8th of April, 2024, invitation by Prof. John Long, Vasser College, Poughkeepsie, NY, USA.

2024: "Eco-Effective Robotics: A Contingency for Ecosystem Decay?" 4th of April 2024, invitation by Prof. Maurizio Porfiri, Tandon School of Engineering, NYU, Brooklin, NY, USA.

2024: "Bio-hybrid robotic systems: A contingency for ecosystem decay?". COLIBRI Focus Wokshop "BIOHYBRIDS THROUGH ORGANISM-TECHNOLOGY- INTERACTIONS – Models, Methods, Potentials, Epistemology & Ethics. 18th February 2024.

2023: Live (streamed) presentation of the Hiveopolis technology (protoypes) at the BioBienenApfel Event, 30th of March in Vienna, Austria, to international media and selected guests: Sebastian Vettel, Othmar Karas, Elina Garanca, Dominic Thiem, Andreas Gabalier, Franco Foda, Elisabeth Görgl, Mario Barth, Lisa-Marie Schiffner, Karl & Katrin Hohensinner et al. Invitation by Frutura, Austria through Dr. Philipp Berkessy.

2022: Live (streamed) presentation of the Hiveopolis technology (protoypes) at the BioBienenApfel Kickoff Event in Munich, 14th of May in Munich to international media and selected guests: Sebastian Vettel, Othmar Karas, Andreas Gabalier, Franco Foda, Charlott Cordes, Elisabeth Görgl, Andreas Döllerer, Lisa-Marie Schiffner, Karl & Katrin Hohensinner et al. Invitation by Frutura, Austria through Dr. Philipp Berkessy.

2022: "Embedded technology can modulate collective decision making in natural swarm organisms". Invited Talk at the symposium "The Digital Future of Bees" at the University of Limerick, 4th of March.

2021: "Liquid brains, before 'liquid brain' was a thing". Invited talk (invitation by Prof. Dr. Bernat Corominas-Murtra) as part of the PhD seminar of the "Complexity of Life" Doctoral Academy at the University of Graz, Austria on December 17.

2021: "Bio-inspirierte & bio-hybride Technologie zur Stabilisierung geschädigter Ökosysteme". Invited talk (invition by Prof. Dr. Robert Felfe) as part of the the AVL-Ringvorlesung "Kulturthema: TIERE - Bestien, Verwandte, kulturelle Akteure?" at the Zentrum für Kulturwissenschaften, University of Graz, Austria on December 13.

2021: Panel discussion at the Virtual Vehicle "Beyond AI" summer school in Graz, Austria on September 15.

2021: „Natural & robotic swarms: Applying technology to modulate collective decision making in natural and bio-hybrid systems." Invited talk at the pre-COP26 conference (Italy, Ministry of the Environment). Invitation by Prof. Cesare Stefani, Scuola Superiore Sant'Anna, Pontedera, Italy

2021: Keynote talk „Fixing Broken Ecosystems with Autonomous Robot Swarms." Invited talk at SCIFI-IT 2021, Science Fiction Prototyping Conference at the University of Leuven, Ghent Research Centre in Ghent, Belgium from April 14-16, 2021 on invitation by Dr. Philippe Geril (Ghent, Belgium)

2021: „Proactive Monitoring & Ecosystem Hacking: The Role of Robots in the Ongoing Ecosystem Crisis." (Purdue University, USA) Invited seminar talk in an online-course about bio-hybrid systems. 2.2.2021, invitation by Prof. Jason Parry, Purdue University, USA

2020: "From Proactive Monitoring to Ecosystem Hacking: The Role of Robots in the Ongoing Ecosystem Crisis" at IROS 2020, 22nd-29th of October 2020, IEEE/RSJ IROS Conference LAS VEGA (USA) in the Workshop on animal & robot interaction, invitation by Donato Romano & Cesare Stefanini)

2020: "Ökologische Nachhaltigkeit: Wie kann man moderne Technik zum Schutz der Umwelt einsetzen?". In lecture series "Was ist Nachhaltigkeit?, 14th Oct. 2020, invitation by Mag. Dr. Christian Kozina, RCE Graz-Styria - Zentrum für nachhaltige Gesellschaftstransformation, Karl-Franzens-Universität Graz.

2020: Podium discussion "Nachhaltige Entwicklung, 14th Oct. 2020, invitation by Mag. Dr. Christian Kozina, RCE Graz-Styria - Zentrum für nachhaltige Gesellschaftstransformation, Karl-Franzens-Universität Graz.

2020: Public interview at the Future Tech Week (EU - EIC) 21.-25. Sept. 2020 (Interview with Erich Prem, FET-EU)

2020: Public video presentation Hiveopolis at the Future Tech Week (EU - EIC) 21.-25. Sept. 2020

2020: GreentechCluster Innovators Club Keynote "Autonome Roboter für Umwelt-Monitoring und Interventionen", 6th oct. 2020, invitation by Johann Koinegg, Green Tech Cluster Styria GmbH, held online due to Covid19 pandemic.

2020: "Robot Swarms for Repairing Broken Ecosystems" at the Fakultätskolloquium of the Faculty for Computer Science, Electrical Engineering and Mathematics, Invitation by Prof. Holger Karl und Prof. Markus Holt.

2019: „Repairing broken Ecosystems with autonomous robot swarms“ at NJIT, Newark, New Jersey, USA, invitation by Prof. Simon Garnier (Federated Department of Biological Sciences)

2019: „Repairing broken Ecosystems with autonomous robot swarms“ at NYU - Tandon School of Engineering, Brooklyn, New York, USA, invitation by Prof. Giuseppe Loianno (RiskEconLab, Courant Institute of Mathematics)

2019: “Artificial Life: approaching the core” at Binghamton University, Binghamton, New York, USA, invitation by Prof. Hiroki Sayama (System Science and Industrial Engineering)

2019: „Repairing broken Ecosystems with autonomous robot swarms“ at Binghamton University, Binghamton, New York, USA, invitation by Prof. Hiroki Sayama (System Science and Industrial Engineering)

2019: Invited talk at the International Conference at the University of Graz, “Questioning the Non-Human Other Political Potentials of Living Beings in Art” (17.-19.10.2019): “Repairing broken ecosystems with robotic surrogates”, invited by Sabine Flach, Institut für Kunstgeschichte, Graz, Österreich

2019: Invited talk at the EU European Innovation Days (24. – 26.09.2019): “Will Robots save Nature? How autonomous robotic agents can help us to prevent the current ecological collapse”, invited by the EU, Brussels Belgium

2019: Invited plenary talk at Vienna Design Week 2019: “Technological Augmentation of Ecosystems for a Sustainable Biosphere”. Invitation by Vienna Design Office.

2019: Invited talk at the International Symposium, Exhibitions and Workshop (20.-21.06.2019): “Earth without Humans, Repairing Broken Ecosystems with Robotic Surrogates”, invited by Kapelica Gallery and Artificial Life Symposium, Ljubljana, Slovenia

2019: Invited talk at the “AEC Eröffnungsfeier Linz” (15.-16.06.2019): “Symbiotische Berechnung von Bio-Hybridsystemen” invited by the Ars Electronica Linz, Linz, Austria

2019: Invited talk at the Sustainability4U Ringvorlesung 2019 (20.03.2019): “Können Roboter die Natur retten? Der Beitrag automomer Roboter (-Schwärme) zur Beobachtung und Reparatur bedrohter Ökosysteme“, invited by Sustainability4U, Graz, Österreich

2018: Invited talk at the workshop: "SCIENTIĆ & ROBOTICA" (05. – 08. September 2018),“Robotertiere, kybernetische Pflanzen und gemischte Gesellschaften”, invited by EPFL Francesco Mondada, Lausanne, Schweiz

2018: Invited talk at the conference: ICTP International Centre for Theoretical Physics (07.-11. May 2018): “Mathematical Modeling of Collective Deception and the Emergence of Fundamentalism”, invited by ICTP commitee, Triest, Italy

2018: Invited talk on the Research Seminar in Economics (09.01.2018): Artificial Life in Graz: Collective Decision in Animals and Robots invited by Christoph Kuzmics, Universität Graz

2017: Invited talk at the Round table organized by AVL List GmbH and the University of Graz presenting the technical developments researched at the Artificial Life Lab Graz**.**

2017: Invited talk at the Akademie Graz, "swarming and networking" (23.08.2017): "Lecture on Artificial Life", invited by Akademie Graz, Österreich

2017: Summer School ASSISIbf (Graz, Austria, 29.-31.08.2019): "From Honey bees to bio-hybrid robot swarms", opening lecture (29th August 2017)

2017: Invited talk at the Lakeside Research Days 2017: Self-Organization and Swarm Intelligence in Cyber Physical Systems (10.-12. July 2017): "Bio-inspired swarm robotics: From honeybees to space exploration", invited by Wilfried Elmenreich, Professor of Smart Grids, Institute of Networked and Embedded Systems, Alpen-Adria-Universität Klagenfurt

2017: Invited talk at the conference: IVth International Conference on Research and Education (Poznan, Poland, 06.-08. April 2017): "Robots and honeybees: decoding smart swarms", invited by Dr hab. Agnieszka Ludwików, Adam Mickiewicz University in Poznań

2017: Invited talk at the workshop: "Annäherung an die Natur. Zum Einsatz von Computersimulationen in der Bionik", (Lüneburg, Deutschland, 30.01.-01.02.2017): "Animal and Robot Societies Self-Organse and Integrate by Social Interaction (Bees and Fish)", invited by Dr. Jan Müggenburg Leuphana University Lüneburg

2016: Invited talk to the Podiumsdiskussion ARS ELECTRONICA (Linz, Austria, 08.-12.09.2016) "Künstliche Intelligenz und Algorithmen", invited by Ars Electronica, Linz, Austria)

2016: Invited lecture at the conference: CAMS 2016, 10th IFAC Conference on Control Applications in Marine Systems (Trondheim, Norwegen, 13.-16. September 2016): "Subcultron - a New Approach to Long-Term Underwater Autonomy", invited by PhD Adjunct Associate Professor Vahid Hassani NTNU, Norway

2016: Invited talk at Workshop „Berechnete Tiere. Technik und Verdatung in den Human-Animal-Studies" (Bochum, Deutschland, 22nd April 2016): "Biohybrid systems - Tiere, Pflanzen, Roboter, Agenten und Algorithmen", invited by Prof. Stefan Rieger

2016: Invited lecture at winter school of projekt ASSISIbf (Lausanne, Switzerland, 12th Jan. 2016): "Honeybee Biology: Collective Behaviors", Opening plenary lecture, invited by Prof. Francesco Montada at EPFL Lausanne, CH.

2016: Invited lecture at EPFL (Lausanne CH, 13th Jan. 2016): "From CoCoRo to subCULTron: Collective Cognition in Autonomous Underwater Robot Swarms", invited by Prof. Alcherio Martinoli

2015: IROS 2015 (Hamburg, Germany, 2th Oct 2015): "Modular bio-inspired algorithms for autonomous underwater robot swarms in CoCoRo and subCULTron" in the workshop "Bioinspired underwater robotics" invited by Prof. Cesare Stefanini.

2015: DZG 2015 (Graz, Austria, 8th Sept. 2015): "Honeybee-inspired models and swarm (robotic) algorithms" in the workshop "Social Behaviour and Self-Regulation in Insects, Swarms and Algorithms".

2015: EMRA 2015 (Lissabon, Portugal, 18th – 19th June 2015): "subCULTron – Approaching the next level", invited by Prof. Nikola Miskovic, University of Zagreb

2015: Montagsakademie der Uni Graz (Graz, Österreich, 04.05.2015): *Soziale Cyborgs : Maschinen und Lebewesen verschmlezen zu Super-Gesellschaften*. Invitation by Prof. Alfred Posch

2015: subCULTron. Workshop "*European Robotics projects: Beyond the Robotics Unit*", 11th March 2015, European Robotics Forum 2015, Vienna. Invitation by Anne Bajart, Olivier Da Costa, Cécile Huet – European Commission.

2015: Collective Cognitive Robotics (CoCoRo). Workshop "*Step change results from FP7 projects*", 12th March 2015, European Robotics Forum 2015, Vienna. Invitation by Cécile Huet , Bjoern Juretzki , Franco Mastroddi – European Commission.

2015: Research overview of the Artificial Life Lab, Graz. At: KNAPP A.G., 6th March 2015. Invitation by Mag. Andreas Miller.

2015: Closing the loop between honeybees & robots in collective decision. At INDP Workshop „Social Insect Behaviour" at Champalimaud Foundation, Lisbon, Portugal, 26th – 29th Jan. 2015. Invitation by Carolina Doran, Simone Lackner, Eugenia Chiappe, Gonzalo G. de Polavieja.

2014: Invited talk on" Schwarmintelligenz-Algorithmen" at Knapp AG, Invitation by Mag. Andreas Miller.

2014: Collective behaviors in honeybees: from observation to modeling to re-embodiment to bio-hybrid systems. Seminar at Université libre de Bruxelles (ULB). 17th Dec. 1014. Invitation by Prof. Jean-Louis Deneubourg.

2014: Der Bot im Schwarm: Wie Roboter und Gesellschaften zu einem völlig neuen homogenen Ganzen verschmelzen. TEDxGRAZ talk, 12th Nov. 2014. Invitation by Friso Schopper. https://www.youtube.com/watch?v=eS4dyznbdnc

2014: Social Adaptation of Robots for Modulating Self-Organization in Animal Societies. FOCAS workshop at the SASO 2014 Conference, 8th - 12th Sept. 2015 at the Imperial College in London, UK. Invitation by Prof. Emma Hart and Jennifer Willies.

2014: Robots & honeybees: Establishing behavioural feedback loops between animals and machines. In: Symposium **"**Emergent social behaviours in bio-hybrid systems" at Living Machines 2014, Milano, Italy, 30th July – 1st August 2014. Invitation by Prof. Stuart Wilson.

2014: Evolving bio-hybrid societies of animals and robots. Opening Keynote at the EvoStar 2014 Conference at Granada, Spain 23-25 April. Invitation by Jennifer Willies and Prof. Emma Hart and Prof. J.J. Merelo.

2014: Evolvierende bio-hybride Gesellschaften. Akademie-Vortragsreihe "Digitale Gesellschaft: Erkennen – Manipulieren – Schützen – Produzieren" of the Nordrhein-Westfälische Akademie der Wissenschaften und der Künste, Düsseldorf, Germany, 9th April 2014. Invitation by Prof. Franz Rammig.

2014: ASSISI_bf: Advocating bio-hybrid mixed societies of robots and animals. FET Proposers' Day. 20th Jan. 2014, at DIAMANT Conference & Business Centre in Bruxelles. Invitation by Walter van der Velde, Christiane Wilzeck and Teresa De Martino.

2013: Schwarmintelligenz und bio-hybride Gesellschaften. Lecture at "Biologisches Kolloquium" at the University of Bonn. 2nd Dec. 2013. Invitation by Prof. Gerhard von der Emde.

2013: Embodied & collective intelligence in natural and artificial autonomous agents. Lecture at the "Informationskolloquium" of the Department of Computer Science, University of Paderborn. 12th Nov. 2013. Invitation by Junior-Prof. Dr. Heiko Hamann.

2013: The new Cyborgs: Robots and Animals Forming a Mixed Society? Lecture at the IEEE Croatian Section 2013 Lecture Series organized by Control Systems Chapter (CS23) and Robotics and Automation Chapter (RA24). 5th Nov. 2013 at University of Zagreb, LARICS, Invitation by Dr. Stjepan Bogdan.

2013: "Was Roboter von Tieren und BiologInnen von Robotern lernen können". Vita Activa Vortragsreihe, University of Graz. 19th March 2013.

2013: "From biology & robots to bio-hybrid systems: establishing adaptive social cyborgs". Invited talk in the workshop "Emergent social behaviours in bio-hybrid systems" at Living Machines 2013, London, UK, 29th July - 2rd August 2013.

2013: "Collective artificial intelligence in autonomous embodied agents". University of Machester (U.K.) 19th June 2013. Invitattion Dr. Alexandru Stancu.

2012: "Insects – Robots – Humans – Philosophy of the collective cognition: A journey through the mind of the masses". 6th of September 2012. ETSU, USA.

2012: "What is the IQ of one ant or one simple robot? And what if there are more than one to take the test?" 10th of October 2012. ETSU, USA.

2012: "Terminator, Matrix and Star Wars: How (far) will robots develop in our lifetime?" 1st of November 2012. ETSU, USA.

2012: Invited lecture in the Department Seminar of the Department for Biology. 3rd of October 2012, ETSU, USA. Invitation by Dr. I. Karsai.

2012: Invited talk at the Seminar for the Institute for Quantitative Biology (IQB). 24th of October 2012. ETSU, USA. Invitation by Dr. Debra Knisley.

2012: Invited talk in at the class "Great Ideas in Science". 29th of November 2012. ETSU, USA. Invitation by Dr. D.W. Harker and Dr. F.B. Hagelberg.

2012: Invited talk in the class "Modern drama" on swarm robots in theatre plays. 19h of November 2012. ETSU, USA. Invitation by Dr. K. Weiss.

2012: Round table on collective cognition and swarm intelligence", 16th of November 2012, ETSU, USA. Invitation by Dr. Debra Knisley.

2012: Invited talk "From biological models to bio-inspired robots" at the University of Zagreb. 5th of April 2012, invitation by Prof. Stjepan Bogdan.

2012: “Collective Cognitive Robots” at the CogSys Conference 2012 (5th International Conference on Cognitive Systems), 23rd Feb. 2012, Vienna.

2011: Invited talk in the seminar of the Plant and Invertebrate Ecology Department at Rothamsted Research, Harpenden, UK on the 2nd November 2011. Title "Honeybees, robots and other living things" (invitation by Dr. Matthias Becher and Dr. Juliet Osborne).

2011: “Honeybees & robots: Collective decision making and coordination in autonomous swarm systems” in the "Artificial Intelligence Seminar" at the Information Sciences Institute, University of Southern California (invitation bei Wei-Min Shen)

2011: Demonstration (in presentation form) "Spatial computing in modular robotics" at the workshop "Spatial Computing" (10min) 3rd Oct. 2011, SASO 2011, Ann Arbor, MI, USA.

2011: “Simemould - a collective and distributed intelligence” in the course “Holistische Wissenschaften” (“holistic sciences”), LVA-No: 7771090, at the Universität für Bodenkultur (BOKU) Vienna, Austria (invited by Prof. Thomas Prohaska)

2010: Workshop: 2010 IEEE International Conference on Robotics and Automation, Anchorage, Alaska, May 3-8, 2010, Workshop on Bio-Inspired Self-Organizing Robotic Systems. Title: Bio-Inspiration and Artificial Evolution in Collective Robotics.

2010: Workshop of the Research Core Area “Modelling and Simulation”. Titel: Self-organized biological systems: Modelling, Simulation and Artificial Evolution.

2009: EU FET proactive external consultation workshop “fundamentals of collective adaptive systems“. Title: “Creating adaptive systems that are as rich as their natural counterparts? Challenges for Evolvability”. 3.-4. November 2009, Leuven, Belgium.

2009: Workshop/info-day “ICT on tour: Cognitive systems, Interaction, Robotics” of the FFG (Forschungsförderungsgesellschaft) Title: “Erfahrungsbericht aus dem RP7 "Replicator" oder die Biologie als Vorlage für robotische Kontrollarchitekturen”. TU Graz, 10.12.2009.

2008: Workshop "Cognitive Robotics" (26.6.08 Budapest), invited talk by George Kampis, Collegium Budapest. Title: "Why robots are suitable models for the research of swarm phenomena"

2008: Workshop on Modelling Complex Biological Systems, 17th-18th April 2008, Uppsala, Sweden. Organized by: David Sumpter**.**“Individual-based models of honeybee intra-colonial regulation: Task-selection, nutrient allocation, brood care and navigation”.

2007: “Complex Behavior: From honeybees to robot swarms”. Seminar of the Departments of Biological Sciences & Health Sciences, ETSU, Jonson City, TN, USA. (Seminar BIOL-5700, invited by the organizer Zulfiqar Ahmad)

2005: “Swarm Intelligence and Self-Organization in Biology”. Course Number 621.150, Seminar on Optimization and Control in Physiological Systems (for Mathematicians and Life Scientists) (2 hours of course credit) organized by: F. Kappel, T. Kenner, D. Schneditz, J. Batzel, D. Auerbach, M. Bachar, M. Fink. (Spezialforschungsbereich F-003) sponsored by the Austrian Science Fund, Graz, Austria.

2005: "Multi-Agentensimulation der dezentralen Regulation der Arbeitsteilung bei Honigbienen", at the „2nd Day of science", organized by CEQUACOS, Center for Quantitative and Computational Sciences, Graz, Austria.

2002: "Multiagenten Simulation in der Biologie", at the "1st Day of Science", organized by CEQUACOS, Center for Quantitative and Computational Sciences, Graz, Austria.

Public Exhibitions:

2024: Exhibition "HIVEOPOLIS: A Biohybrid Beehive" of the Hiveropolis fungus hive and of the digital brood comb in the Comminication Parcour exhibit (one-year exhibition) in the European Commission's Piazza Project, Brussels (in the Foyer of the Berlaymont, Brussels)

2024: Exhibiting Hiveopolis technology at the EIC Summit 2024, 18th-20th March 2024 in Brussels

2024: Exhibiting Hiveopolis technology at the Research & Innovation Days 2024, 20st-21nd March 2024 in Brussels

2023: Exhibition of Hiveopolis & RoboRoyale technology at the "BioBienenApfel" event in Vienna, Austria, 30th of March.

2023: Exhibition "Beeing/Beecoming: Scutoid Habitats", Club Hybrid, AKT Pavilion. 3D printed clay modules holding mycelium composites as an insect-friendly algorithmic design demonstration. Technologies from EU project Hiveopolis, made in the Artificial Life Lab Graz.

2022: Exhibition of Hiveopolis and RoboRoyale prototypes at the "Lange Nacht der Forschung" at the Aula of the University of Graz, 20th of May.

2022: Semi-public exhibition of several Hiveopolis prototypes to Othmar Karas (Vice-President European Parliament) and Katrin Hohensinner (Managing Director of Frutura, Austria) with the President of the University of Graz, Dr. Peter Riedler at the University of Graz (Aula and Labs), 14th of May.

2022: Exhibition of several Hiveopolis prototypes prototype together with Sebastian Vettel in Spielberg, Austria, as a side event of the F1-GrandPrix. 11th July.

2022: Exhibition of several Hiveopolis prototypes and one RoboRoyale prototype to public media (co-hosted with Sebastian Vettel and Lisa-Marie Schiffner) at the "BioBienenApfel" Kickoff event in Munich, 27th of April.

2022: Exhibition "I.N.S.E.C.T. Wall Twin: Designing for and with Insects, Fungi, and Humans." In Newcastle upon Tyne, UK. 3D printed clay modules (developed in the EU project Hiveopolis in the Artificial Life Lab Graz) holding mycelium composites as an insect-friendly facade tiling installation.

2022: Exhibition of various prototypes and experimental research setups in 2 distinct shows to particpants of the hackathon "Change" and the "Brain, Behavior & Society" Springschool at the University of Graz, 8th of April.

2021: Exhibition at the "STEIERMARK SCHAU: was sein wird" at the Kunsthaus Graz, Austria (April - October 2021) with the title "HIVEOPOLIS: Beehives of the Future", exhibiting the ongoing technological developments to communicate with honeybees.

2021: Exhibition at the „STEIERMARK SCHAU: was sein wird" at the Kunsthaus Graz, Austria (April - October 2021) with the title "The Living Arch: A Study Model for a Novel

Wellbeing Architecture for Honeybees", exhibiting the sustainable and organic construction method of HIVEOPOLIS hives.

2019: Exhibition at the VIENNA DESIGN WEEK “HIVEOPOLIS: Biohybrid superorganisms diversify urban ecological niches“, exhibiting the work of the EU Project HIVEOPOLIS towards the smart beehive of the future.

2019: Exhibition at the Digital Design Market Platform – RESPOND FESTIVAL, Copenhagen, Denmark: “Intelligent Beehives of the Future“, showcasing the HIVEOPOLIS smart beehive of the future. Invitation by: COPENHAGEN MAKER

2019: Exhibition at the VIENNA MAKER FAIRE 2019: “(make)ROOM FOR SHROOM”.

2018: Ars Elecronica Festival, Linz, Österreich (06.09.2018 – 10.09.2018)

2018: Exhibition on shaping Europe's digital future at ICT 2018, Vienna: FET-Proactive subCULTron project at Exhibition booth C03 (04.12.2018 - 06.12.2018).

2017: Bienentage, Graz, Österreich (22.04.2017 – 23.04.2017)

2017: Press event on subCULTron at Arsenale, Venice, Italy (14.09.2017- 15.09.2017).

2016: Ars Electronica Festival, Linz, Österreich (08.09.2016-12.09.2016)

2016: Grazer Frühjahrsmesse “Grazer Frühjahrsmesse macht Schule: “Wunderwelt Bienen”, Graz, Österreich (28.04-2016 - 02.05.2016)

2015: EXPO 2015 “subCulTron underwater robot installation”, Venice, Italy (16.10.2015 – 31.10.2015)

2014: CeBit 2014, “CoCoRo underwater robot installation”, Hannover, Germany (10.03.2014 – 14.03.2015)

2014: Multiple live presentations of honeybee-inspired swarm robots. TEDxGRAZ talks, Graz, Old University, 12th Nov. 2014. Invitation by Friso Schopper.

2013: Live presentation of a robot swarm performing the honeybee-inspired robots at “Tag der Naturwissenschaften” at the Aula of the Karl-Franzens-University Graz (16.11.2013).

2010: Exhibition of our bio-robotic swarms at the “RESEARCH 2010” in Graz, Austria (11.6.-12.6.2010).

2010: Museum installation of a robotic implementation of a phosphorescent ant-trail system in the museum “Haus der Wissenschaften” at the exhibition named “Abenteuer Wissenschaft 3”, 24 performances.

2010: Theater performance of swarm robotic algorithms supervised/consulted by the AL-Lab Graz in the theatre play “2012 – Übermorgen is zweifelhaft” at the “Münchner Kammerspiele” by video-, performance- and theater-artist Chris Kondek (http://www.youtube.com/watch?v=FERe9LfFZl4), 6 performances.

2006: Museum installation of a robot swarm (20 JASMINE robots) in the museum "Haus der Wissenschaften" at the exhibition named "Nobelpreisträger", which was partially focused on the work and life of Nobel price winner Karl von Frisch.

Additional Management, Media-related & Teaching Qualifications:

2019: Training at UNIGRAZ: "Communicating feedback" (1 day)

2019: Training at TU Graz: "Protect and exploit your scientific results – an overview of IPR protection and exploitation possibilities" (1 day)

2017: UNISTART - Basic training modules 1 & 2: "Introduction to leadership & human ressource development as a leadership objective" (0.5 days)

2017: UNISTART - Basic training module 3: "Employment law and staff management as a leadership skill" (1 day)

2017: UNISTART - Basic training module 4: "Leading teams and groups" (2 days)

2017: UNISTART - Basic training module 5: "Hard facts of leadership" (1 day)

2017: UNISTART - Basic training module 5: "Research – Teach – Lead: Challenges for scientific leaders" (1 day)

2017: UNISTART – Advanced module W5: "Conflict management" (2 days)

2017: UNISTART – Advanced module W6: "Negotiation management" (1 day)

2017: UniIT Training: "Constructing and conducting online tests with Perception" (1 day)

2002 - 2003: Teacher training in "eLearning" and "web-based teaching" at the University of Applied Sciences Joanneum, Graz (3 month course).

2002: Teacher training in in "eLearning" and "web-based teaching" at the University of Graz (3-month course).

1997: Teacher training "Teaching and learning in on-the-job-trainings" (WIFI, 80 hours course).

1989-2003: Part-time professional photographer at the company "Foto Schmickl", Graz.

Publications

Theses:

Habilitation thesis: ***Schmickl T.*** (**2012**) "*The Collective Physiology of the Swarm: Modelling Self-Organization, Self-Regulation and Swarm-Intelligence of Distributed Systems in Biology and Bio-Robotics*", Karl-Franzens University Graz.

Ph.D. thesis: ***Schmickl T.*** (**2001**) "Regulation of brood development in the honeybee (*Apis mellifera* L.): Feedback mechanisms and survival strategies of a superorganism", Karl-Franzens University of Graz.

Master thesis: ***Schmickl T***. (**1998**) "Die Erfassung des mikrobiologischen Status in der Innenraumluft von Krankenanstalten", University of Salzburg. ("Assessment of the microbiological status of the indoor air in styrian public hospitals").

Editing of special issues in scientific journals:

1. Romano, D., ***Schmickl, T.***, Hamann, H., Farshad, A., Wahby, M., (**2023**) "Biohybrids, Bioinspired and Biomimetic Agents for Dynamic and Complex Environments" in *Sensors*, MDPI.
2. ***Schmickl, T.***, Romano, D., Zahadat, P., Porfiri, M. (**2023**) "Biohybrid Systems: Bioinspired and Biomimetic Robots Interacting with Living Organisms" in *Bioinspiration & Biomimetics*, IOPscience.
3. Hamann, H., ***Schmickl, T.*** (**2011**) Special Issue: "Modelling the Swarm – Analysing biological and engineered swarm systems" in *Mathematical and Computer Modelling of Dynamical Systems*, Taylor & Francis. DOI: 10.1080/13873954.2011.601426.

Books:

- Karsai, I., ***Schmickl, T.***, Kampis, G. (**2020**). Resilience and Stability of Ecological and Social Systems. Springer Cham., ISBN 978-3-030-54560-4

Peer-reviewed full articles in journals, book series and proceedings:

1. ***Schmickl, T.*** (**2024**). Memetic robots. *Nature Machine Intelligence*, 1-2, https://doi.org/10.1038/s42256-024-00959-8

2. ***Schmickl, T.*** & Romano, D. (**2024**). Robots and animals teaming up in the wild to tackle ecosystem challenges. *Science Robotics*, *9*(96), eado5566.

3. Ulrich, J., Stefanec, M., Rekabi-Bana, F., Fedotoff, L.A., Rouček, T., Gündeğer, B.Y., Saadat, M., Blaha, J., Janota, J., Hofstadler, D.N. and Žampachů, K., Keyvan, E.E.,

Erdem, B., Şahin, E., Alemdar, H., Turgut, A.E., Arvin, F., ***Schmickl, T.***, Krajník, T. (**2024**) Autonomous tracking of honey bee behaviors over long-term periods with cooperating robots. *Science Robotics* 9, no. 95: eadn6848.

4. Gogoi, N., Helmer, N., Wu, C., Thenius, R., Casson, A., ***Schmickl, T.*** & Arvin, F. (**2024**). Biohybrid Sensors for Underwater Monitoring. In *IEEE Applied Sensing Conference*. IEEE.

5. Blaha, J., Mikula, J., Vintr, T., Janota, J., Ulrich, J., Rouček, T., Rekabi-Bana, F., Fedotoff, L.A., Stefanec, M., ***Schmickl, T.***, Arvin, F., Kulich, M. & Krajník, T. (**2024**). Effective Searching for the Honeybee Queen in a Living Colony. In: *2024 IEEE 20th International Conference on Automation Science and Engineering (CASE)* (pp. 3675-3682). IEEE.

6. Rekabi-Bana, F., Saadat, S., Kalantaryardebily, N., Stefanec, M., Fedotoff, L.A., Pan, H., Krajník, T., ***Schmickl, T.***, Arvin, F (**2024**) Active Vibration Reduction for the Autonomous Observation Mechanism. In: *2024 IEEE Conference on Control Technology and Applications (CCTA)*, pp. 805-810. IEEE, 2024.

7. Stefanec, M., Fedotoff, L., Arvin, F., ***Schmickl, T.***, Krajník, T. (**2024**) Towards Robotic Mapping of a Honeybee Comb. In: *2024 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS)*, pp. 1-6. IEEE, 2024.

8. Ilgün, A., Szopek, M., ***Schmickl, T.*** (**2024**) The Eusocial Cathedral and the Buzzaar: A Novel Synthesis from De-and Reconstructing the Living and the Artificial. *The Cultures of Entanglement: On Nonhuman Life Forms in Contemporary Art* 233 (2024): 327.

9. Romano, D., Porfiri, M., Zahadat, P., ***Schmickl, T.*** (**2024**) Animal–robot interaction—an emerging field at the intersection of biology and robotics. *Bioinspiration & Biomimetics* 19, no. 2 (2024): 020201.

10. Barmak, R., Hofstadler, D. N., Stefanec, M., Piotet, L., Cherfan, R., ***Schmickl, T.***, Mondada, F., Mills, R. (**2024**). Biohybrid superorganisms — on the design of a robotic system for thermal interactions with honeybee colonies. *IEEE Access 12*, 50849-50871. DOI: 10.1109/ACCESS.2024.3385658

11. Rajewicz, W., Wu, C., Romano, D., Campo, A., Arvin, F., Casson, A.J., van Vuuren G.J., Stefanini, C., Varughese, J.C., Lennox, B., Schönwetter-Fuchs, S., ***Schmickl, T.***, Thenius, R. (**2023**). Organisms as sensors in biohybrid entities as a novel tool for in-field aquatic monitoring. *Bioinspiration & Biomimetics*, 19(1), 015001.

12. Rajewicz, W., Romano, D., ***Schmickl, T.***, Thenius, R. (**2023**). Daphnia's phototaxis as an indicator in ecotoxicological studies: A review. *Aquatic Toxicology*, 106762, DOI: 10.1016/j.aquatox.2023.106762

13. ***Schmickl, T.***, Karsai, I. (**2023**). Self-complexification through integral feedback in eusocial paper wasps of various levels of sociality. *Heliyon* 9(9), e20064. DOI: 10.1016/j.heliyon.2023.e20064.

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19. ***Schmickl T.***, Crailsheim K. (**2000**) Nursing of honeybees depending on weather, resources and other hive conditions (Apis mellifera L.). *Apidologie* 31: 642-644.

20. ***Schmickl T***., Crailsheim K. (**1998**) The influence of weather conditions on brood nursing by honeybees (*Apis mellifera* L.). *Apidologie* 29: 460-462.

Abstracts in citable conference proceedings (editor reviewed):

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2. Hahshold, S., Ploder, R., Radspieler, G., Szopek, M., ***Schmickl, T.***, Crailsheim, K. (**2016**) Behaviour of single young honeybees and groups of young honeybees in a temperature gradient. In: EUROIUSSI (Hg.): EUROIUSSI Abstract book

3. Szopek, M., Hahshold, S., Thenius, R., Bodi, M., Crailsheim, K., ***Schmickl, T.*** (**2014**) ASSISIbf: Honeybees and robots form a bio-hybrid society. Entomologica Austriaca 21 (OEG Tagung Abstracts).

4. Szopek, M., Bodi, M., Hahshold, S., Thenius, R., ***Schmickl, T.*** (**2014**) ASSISIbf: A new pathway to examine collective behaviours in honeybees. In: IUSSI (Hg.): Abstract Book of the XVII IUSSI International Congress (Cairns, Australia).

5. Szopek, M., Hahshold, S., Thenius, R., Bodi, M., ***Schmickl, T.***, CrailsheimK. (**2013**) The path to ASSISI|bf: How honeybees and machines can make collective decisions. 60. AG Tagung der deutsprachigen Bieneninstitute, Würzburg, Germany.

6. Hahshold S., Szopek M., Radspieler G., Thenius R., ***Schmickl T.***, Crailsheim K.: (**2012**) *Collective decision making in honeybees: temperature gradient vs social gradient.* In: (Hg.): Abstracts for the 5th Congress of the European Sections of International Union for the Study of Social Insects, Montecatini Terme, Italy.

7. Szopek, M., Bodi, M., Radspieler, G., ***Schmickl, T.,*** Crailsheim, K (**2012**) Modelling collective decision making in honeybees. Eurbee 2012, Halle (Saale), Germany.

8. Kengyel D., Radspieler G., Wotawa F., ***Schmickl T***. (**2012**): OR: *Emulation of collective honeybee behaviour by a swarm of simple robot*, für: 5th Congress of the European Sections of the International Union for the Study of Social Insects, Montecatini Terme, Italy.

9. Hahshold S., Szopek M., Radspieler G., Thenius R., ***Schmickl T.***, Crailsheim K. (**2010**) Collective Decision making in honeybees: environmental attraction factors versus socially driven aggregation. In: David R. Nash Susanne P.A. den Boer Henrik H. De Fine Licht Jacobus J. Boomsma (eds.): Abstracts for the XVI Congress of the International Union for the Study of Social Insects (*IUSSI'10*) Copenhagen, Denmark, 8-13 August 2010.

10. ***Schmickl T.***, Radspieler G., Szopek M., Hahshold S., Thenius R., Wissekal D., Crailsheim K. (**2010**) From honeybee behaviour to swarm robotics. In: David R. Nash Susanne P.A. den Boer Henrik H. De Fine Licht Jacobus J. Boomsma (eds.): Abstracts for the XVI Congress of the International Union for the Study of Social Insects (*IUSSI'10*) Copenhagen, Denmark, 8-13 August 2010.

11. Szopek M., Radspieler G., Thenius R., ***Schmickl T.***, Crailsheim K. (**2010**) Cooperative thermotaxis of honeybees in a complex and dynamic thermal environment. In: David R. Nash Susanne P.A. den Boer Henrik H. De Fine Licht Jacobus J. Boomsma (eds.): Abstracts for the XVI Congress of the International Union for the Study of Social Insects (*IUSSI'10*) Copenhagen, Denmark, 8-13 August 2010.

12. Szopek M., Radspieler G., ***Schmickl T.***, Thenius R., Crailsheim, K. (**2008**) PO: Recording and tracking of locomotion and clustering behaviour in young honeybees (Apis mellifera), Measuring Behavior 2008.

13. ***Schmickl T.***, Thenius R., Crailsheim K. (**2005**) Collective decision making: A multi-agent simulation of a foraging honeybee colony. In: Bees, Ants and Termites: Applied and Fundamental Research, edited by: HH Kaatz, M Becher and RFA Moritz, IUSSI International Union zum Studium der Sozialen Insekten. Halle/Saale, Germany. ISBN 3-901864-02-4. pp. 138.

14. Thenius R., ***Schmickl T.***, Crailsheim K. (**2005**) Importance of heterogeneity in honeybee (*Apis mellifera* L.) dance-response curves for optimal foraging. In: Bees, Ants and Termites: Applied and Fundamental Research, edited by: HH Kaatz, M

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15. ***Schmickl T.***, Crailsheim K. (**2005**) A mathematical model for predicting intra-colonial population dynamics of honeybees. In: Bees, Ants and Termites: Applied and Fundamental Research, edited by: HH Kaatz, M Becher and RFA Moritz, IUSSI International Union zum Studium der Sozialen Insekten. Halle/Saale, Germany. ISBN 3-901864-02-4. pp. 60.

16. ***Schmickl T.***, Crailsheim K. (**2004**) Analyzing the efficiency of honeybee foraging decisions by multi-agent simulation. In: Proceedings of the First European Conference of Apidology (EURBEE'04). 19th-24th September 2004, Udine, Italy, edited by I. Bernardelli and N. Milani, Arti Grafiche Friulane SpA, Udine, ISBN 88-86550-99-5, pp. 52.

17. Petz M., ***Schmickl T.***, Crailsheim K. (**2004**) Simulating the adaptation of nursing to changes of colony supply to brood ratio. In: Proceedings of the First European Conference of Apidology (EURBEE'04). 19th-24th September 2004, Udine, Italy, edited by I. Bernardelli and N. Milani, Arti Grafiche Friulane SpA, Udine, ISBN 88-86550-99-5, pp. 53-54.

18. Brodschneider R., ***Schmickl T.***, Crailsheim K. (**2004**) Individual nurse bees' behaviour in changing nursing workloads. In: Proceedings of the First European Conference of Apidology (EURBEE'04). 19th-24th September 2004, Udine, Italy, edited by I. Bernardelli and N. Milani, Arti Grafiche Friulane SpA, Udine, ISBN 88-86550-99-5, pp. 54.

19. Vollmann J., Hrassnigg N., ***Schmickl T.***, Crailsheim K. (**2004**) Regulation of nursing workforce in a honeybee colony according to different workloads. In: Proceedings of the First European Conference of Apidology (EURBEE'04). 19th-24th September 2004, Udine, Italy, edited by I. Bernardelli and N. Milani, Arti Grafiche Friulane SpA, Udine, ISBN 88-86550-99-5, pp. 55.

20. Hergouth M., ***Schmickl T.***, Crailsheim K. (**2004**) Efficiency of brood care behaviour in dwarf colonies. In: Proceedings of the First European Conference of Apidology (EURBEE'04). 19th-24th September 2004, Udine, Italy, edited by I. Bernardelli and N. Milani, Arti Grafiche Friulane SpA, Udine, ISBN 88-86550-99-5, pp. 55-56.

21. Thenius R., ***Schmickl T.***, Crailsheim K. (**2004**) Formation of multiple transfers in honeybee forager-receiver interaction, a multi-agent simulation. In: Proceedings of the First European Conference of Apidology (EURBEE'04). 19th-24th September 2004, Udine, Italy, edited by I. Bernardelli and N. Milani, Arti Grafiche Friulane SpA, Udine, ISBN 88-86550-99-5, pp. 55-56.

22. ***Schmickl T.***, Crailsheim K. (**2001**) SimBee: Simulating population dynamics and pollen management of a honeybee colony. Proceedings of the IUSSI'2001, Berlin, Germany.

23. ***Schmickl T.***, Crailsheim K. (**2001**) SimBee: Population and resource dynamics of a honeybee colony. Symposium "From the worker to the colony" by the British section of IUSSI, Dez. 2001 in Cambridge, UK.

Participated Conferences, Symposia, Workshops and Exhibits as presenter, panelist or (co-)author of presentations, posters or demonstrators:

2025: IEEE Applied Sensing Conference, India (1 contribution).

2024: IEEE Robosoft 2024, San Diego, USA (1 contribution); COLIBRI Focus workshop, Graz, AT (7 contributions); BioRob 2024 conference, Heidelberg, DE (3 contributions); AQUA 2024 conference, Copenhagen, DK (2 contributions); Complexity of Life conference, Graz, AT (2 contributions); Cladocers 2024 conference, Verbania, IT (2 contributions); DZG Tagung 2024, Stuttgart, DE (1 contribution); IEEE CASE 2024 conference, Bari, IT (1 contribution); IEEE MARSS 2024 conference, Delft, NL (1 contribution), IEEE CCTA, Newcastle, UK (1 contribution).

2023: ALIFE conference 2023, Sapporo, Japan (2 contributions, online); BioBienenApfel Event 2023, Vienna, Austria (1 contribution); Conference on Biomimetic and Biohybrid Systems, Genua, Italy, (1 contribution); IEEE International Conference on Mechatronics, Loughborough , UK (1 contribution); 2nd International Conference on Robotics, Automation and Artificial Intelligence (RAAI), Singapore (1 contribution); ICRA 2023, London, UK (1 contribution); COLIBRI Doc Day, Graz, Austria (1 contribution), MOFA – Mollusken-forschung Österreich, Lunz am See, Austria (1 contribution), German Zoological Society (DZG), Kassel, Germany (2 contributions).

2022: ALIFE conference 2022, Trento, Italy (3 contributions, online); BioBienenApfel Event in Spielberg, Austria (1 contribution); BioBienenApfel Kickoff Event, Munich, Germany (1 contribution); Brain, Behavior & Society Springschool (2 contributions); "Digital Future of Bees", Limerick, Ireland (1 contribution); IROS, 2022; Kyoto, Japan (2 contributions); ICSA2022, Aalborg, Denmark (1 contribution); Lange Nacht der Forschung, Graz, Austria (1 contributions, online); 31st International Conference on Robotics in Alpe-Adria-Danube Region, Klagenfurt, Austria (1 contribution); I.N.S.E.C.T. Summer School, Newcastle, U.K. (1 contribution, presence) and Hvalso Denmark (1 contribution, online); SIL - Austrian Limnological Association conference, Illmitz, Austria (2 contributions); 7th Research Symposium of the Nationalparks, Vienna, Austria (1 contribution); ACA Züchtertagung 2022, St. Johann im Pongau, Austria (1 contribution).

2021: ALIFE conference 2021, Prague, Czech Republic (3 contributions, online); "STEIERMARK SCHAU" at the Kunsthaus Graz (2 contributions), Austria; pre-COP26 conference 2021, Pontedera, Italy (1 contribution); "Biohybrid Systems" at Purdue University, U.S.A. (1 contribution); SCIFI-IT 2021, Ghent, Belgium (1 contribution); "Beyond AI" Virtual Vehicle Cluster summer school, Graz, Austria (2 contributions, online); GUSEGG 2021, virtual event (1 contribution, online); Mycology for Architecture Symposium, virtual event (1 contribution, online); Lecture at the Academy of Fine Arts and Design Bratislava (1 contribution, online).

2020: IROS 2020, Las Vegas, USA (1 contribution, online); IEEE SSCI ALIFE 2020, Cranberra, Australia (2 contributions, online); xCoAx conference, Graz, Austria (1 contribution, online); GreenTech Cluster Innovators Club Event, Graz, Austria (1 contribution, online); EU Future Tech Week, Brussels, Belgium (1 contribution, online); Podium discussion "Nachhaltige Entwicklung", Graz, Austria (1 contribution); EU Future Tech Week (EU-EIC), Brussels, Belgium (2 contributions).

2019: Ars Electronica 2019, Linz, Austria (2 contributions); Kapelica Gallery – Artificial Life Symposium, Ljubljana, Slovenia (2 contriburion); Workshop-subCULTron, Venice, Italy (1 contribution); EU European Innovation Days, Brussels, Belgium (2 contributions); Workshop Hiveopolis, Berlin, Germany (5 contributions); ALIFE 2019, Newcastle, U.K. (3 contributions); Vienna Design Week, Vienna, Austria (2 contributions); Vienna Maker Faire, Vienna, Austria (1 contribution); Respond Festival, Copenhagen, Denmark (2 contributions), Naturally Hypernatural V, Graz, Austria (1 contribution); 3rd Global BioSummit at MIT Media Lab, Boston, USA (2 contributions).

2018: ICTP 2018, Triest, Italy (1 contribution); Ars Electronica 2018, Linz, Austria (1 contribution); "SCIENTIĆ & ROBOTICA", Lausanne, Schweiz (1 contribution); EU ICT 2018 fair, Vienna, Austria (1 contribution).

2017: 4th Faculty of Biology AMU Conference-2017, Wasaw, Poland (1 contribution); IEEE ALIFE 2017, Honolulu, U.S.A (3 contributions); Lakeside Days, Klagenfurt, Austria (1 contribution); Bienentage 2017, Graz Austria (1 contribution); subCULTron Arsenale event, Venice, Italy (1 contribution); Assisi_bf Summer School 2017, Graz, Austria (2 contributions).

2016: Workshop "Berechnete Tiere. Technik und Verdatung in den Human-Animal-Studies" 2016, Bochum, Germany (2 contributions); CAMS 2016, Trondheim, Norway (1 contribution); Ars Electronica 2016, Linz, Austria (1 contribution); Assisi_bf Winter School 2016, Lausanne, Switzerland (2 contributions).

2015: MATHMOD 2015, Vienna, Austria (2 contributions); EVOSTAR 2015, Kopenhagen, Denmark (1 contribution); ECAL 2015, York, U.K. (2 contributions); DZG 2015, Graz, Austria (6 contributions); PRIMA 2015, Bertinoro, Italy (1 contribution); EXPO 2015, Mestre, Italy (1 contribution); IROS 2015, Hamburg, Germany (1 contribution).

2014: SASO 2014, London, UK (1 contribution); GECCO 2014, Vancouver, Canada (1 contribution); EVOSTAR 2014, Granada, Spain (1 contribution); IUSSI 2014, Cairns, Australia (1 contribution); ÖEG-Koloquium 2014, Graz, Austria (2 contributions); Symposium on Biomathematics and Ecology: Education and Research 2014, Claremont, CA, U.S.A (1 contribution); CEBIT 2014, Hannover, Germany (1 contribution); Living Machines, Milano, Italy (1 contribution); TEDxGraz, Graz, Austria (2 contributions).

2013: TAROS 2013, Oxford, U.K. (1 contribution); ECAL 2013, Taormino, Italy (5 contributions); Living Machines 2013 (2 contributions) London, U.K. (2 contributions); SASO 2013, Philadeplphia, U.S.A. (1 contribution); Apimondia, Kiev, Ukraine (2 contributions)**;** German Bee Research Seminar, Würzburg, Germany (2 contributions).

2012: EurBee 2012, Halle an der Saale (3 contributions); IUSSI 2012, Montecatini Terme, Tuscany, Italy (3 contributions); German Bee Research Seminar, Bonn, Germany (2 contributions), SAB, Odense, Denmark (1 contribution).

2011: SSCI'11, Paris, France (1 contribution); FET Conference, Budapest, Hungary (1 contribution); GECCO'11, Dublin, Ireland (1 contribution); ICAR'11, Tallinn, Estonia (1 contribution); IROS'11, San-Francisco, U.S.A (2 contributions); SASO'11, Ann Arbor, USA (1 contribution); ICAIS'11, Klagenfurt, Austria; BIONETICS 2011, York, U.K. (1 contribution).

2010: ICRA'10, Anchorage, U.S.A (1 contribution); CEC'10, Barcelona, Spain (1 contribution); ANTS'10, Brussels, Belgium (2 contributions); Alife XII, Odense, Denmark (3

contribution); IUSSI 2010, Copenhagen, Denmark (5 contributions); SAB'10, Paris, France (1 contribution); RESEARCH 2010, Graz, Austria (1 contribution).

2009: German Bee Research Seminar, Schwerin, Germany (3 contributions); APIMONDIA Montpellier, France (2 contributions); OEG Kolloquium, Graz, Austria (2 contributions); IROS, St. Luis U.S.A (2 contributions); ADAPTIVE 2009, Athens, Greece (1 contribution); IUSSI 2009 Fraueninsel Chiemsee, Germany (3 contributions); ECAL 2009, Budapest, Hungary (7 contributions); MATHMOD, Vienna, Austria (5 contributions); IEEE Congress on Evolutionary Computation (CEC'09), Trondheim, Norway (2 contributions).

2008: Measuring Behavior 2008, Maastricht, Netherlands (1 contribution); 4th European Meeting of the IUSSI (IUSSI'08), La Roche-en Ardenne, Belgium (2 contributions); 3rd European Conference of Apidology (EURBEE'08), Belfast, Northern Ireland (1 contribution); Workshop on Modelling Complex Biological Systems, Uppsala, Sweden (1 contribution); Simulating Artificial Behaviour, Osaka, Japan (1 contribution); Artificial Life XI, Winchester, U.K. (2 contributions); PerMis 08, Gaithersburg, USA (1 contribution); International Conference on Intelligent Robots and Systems, Nice, France (1 contribution); International Conference on Nano-Networks, Boston, U.S.A (1 contribution)

2007: Quantitative Biology Curriculum Planning Workshop, Johnson City, USA (participation); MathFest, San Jose, U.S.A (1 contribution); IUSSI, Bochum, Germany (2 contributions)

2006: MATHMOD, Vienna, Austria (2 contributions); SAB Conference, Rome, Italy (2 contributions); SAB workshop on swarm robotics, Rome, Italy (2 contributions); BIOROB, Pisa, Italy (1 contribution); EURON, Palermo, Italy (participation); EUROBEE, Prague, Czech Republic (1 contribution); IUSSI Washington, U.S.A (1 contribution)

2005: IUSSI, Halle, Germany (3 contributions); GECCO, Washington, USA (1 contribution); CEEMAS, Budapest, Hungary (1 contribution); EURON, Warszaw, Poland (1 workshop); CEQUACOS, Graz, Austria (1 contribution); IUSSI, St. Petersburg, Russia (2 contributions); OEG/ESA Colloquium, St. Pölten, Austria (2 contributions); EURON, Warsaw, Poland (1 workshop contribution); APIMONDIA, Dublin, Ireland (1 contribution)

2004: EURBEE, Udine, Italy (6 contributions); OEG/ESA Expert talk, Graz, Austria (1 contribution); German Bee Research Seminar, Münster, Germany (3 contributions)

2003: IUSSI, Regensburg, Germany (1 contribution); MASI, Atlanta, U.S.A (1 contribution); MATHMOD, Vienna, Austria (1 contribution); European Forum Alpbach (participation)

2002: CEQUACOS, Graz, Austria (1 contribution); Bienentag, Lunz, Austria (1 contribution); European Forum Alpbach (participation).

2001: German Bee Research Seminar, Bad Neuenahr, Germany (2 contributions); IUSSI, Cambridge, U.K. (1 contribution); IUSSI, Berlin, Germany (1 contribution)

2000: German Bee Research Seminar, Blaubeuren, Germany (2 contributions); OEG/ESA Expert talk, Vienna, Austria (1 contribution)

1999: APIMONDIA, Vancouver, Canada (1 contribution)

1998: German Bee Research Seminar, Bremen, Germany (1 contribution)