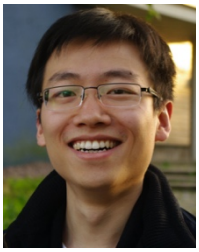

Dr. Yu Liu（刘宇）

Associate Professor, International Academic Center of Complex Systems,
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Work Experience

Associate Professor, International Academic Center of Complex Systems, 2021.08 -
Beijing Normal University at Zhuhai, Guangdong, China.
Topics: Ladderpath evolution, Origin of life, Bioinformatics, Neural networks.

Research Associate, School of Chemistry, University of Glasgow, UK. 2019.07 - 2021.07
Topics: Chemical space, Molecular complexity, Origin of life, Drug design.
With Prof. Leroy Cronin (Regius Chair of Chemistry)

Junior Fellow, Institut Mittag-Leffler, Sweden. 2018.09 - 2018.12
Topics: Mathematical biology, Self-replicating systems, Autocatalysis.
With Prof. Philip Maini, Prof. Maria D'Orsogna, Prof. Torbjörn Lundh

Researcher, Molecular Systems Biology, University of Groningen, Netherlands. 2018.06 - 2019.06
Topics: Build synthetic cells, Mechanism of cell division, Mathematical model.
With Prof. Matthias Heinemann

Education

PhD in **Applied Mathematics and Statistics**, with Prof. David J. T. Sumpter 2013.08 - 2018.04
Department of Mathematics, Uppsala University, Sweden
- Thesis: *Modelling Evolution: from non-life, to life, to a variety of life*

Master of Science in Plasma Physics, College of Physical Science and 2010.09 - 2013.07
Technology (C. Phy.), Sichuan University (SU), China

Bachelor of Science in Physics, C. Phy., SU, China 2006.09 - 2010.06

Double degree of Bachelor of Economics, School of Economics, SU, China 2008.03 - 2010.01

Honor & Scholarship

- Outstanding Achievement Award, Beijing Normal University at Zhuhai 2021.11
- Travel funding, Mathematical Institute, University of Oxford 2019.06
- Lundström-Åman Scholarship, Uppsala University (UU) 2017.05
- Liljewalch travel scholarships, UU 2017.05
- Tullberg Scholarship for biological research, UU 2016.05
- Lundström-Åman Scholarship, UU 2015.10
- **Lotus Scholarship**, Erasmus Mundus Action 2, European Commission 2013.08 - 2016.08
- Outstanding Graduate of Sichuan University (SU) 2009.12
- The First-class Scholarship of SU for good academic record 2008.11

- The First Prize in the 14th General Physics Competition of SU 2007.04
- The Second Prize in Chinese National Olympiad in Informatics 2004.12

Publication (* corresponding author)

Mathematical biology / Mathematical modelling / Complex systems

[13] **Y Liu***, Z Di, P Gerlee, *Ladderpath approach: How tinkering and reuse increase complexity and information*, Entropy, 24(8): 1082, 2022.

[-] **Y Liu***, QG Lin, BB Hong, YR Peng, D Hjerpe, XF Liu*, *Resonance algorithm: An intuitive algorithm to find all shortest paths between two nodes*, Under Review, 2022.

[12] **Y Liu**, C Mathis, M Bajczyk, S Marshall, L Wilbraham, L Cronin*, *Exploring and mapping chemical space with molecular assembly trees*, Science Advances, 7, eabj2465, 2021.

[11] **Y Liu***, *On the definition of self-sustaining chemical reaction system and its role in heredity*, Biology Direct, 15(15), 2020.

[10] **Y Liu***, D Hjerpe, T Lundh, *Side reactions do not completely disrupt linear self-replicating chemical reaction systems?* Artificial Life, 26(3): 327-337, 2020.

[9] D Gruenewald*, R Mehta, **Y Liu**, M Denny, *Sensory perception plays a larger role in foraging efficiency than heavy-tailed movement strategies*, Ecological Modelling, 404: 69-82, 2019.

[8] **Y Liu***, D Sumpter, *Mathematical modeling reveals spontaneous emergence of self-replication in chemical reaction systems*, J. Biological Chemistry, 293(49): 18854-18863, 2018.

[7] **Y Liu***, D Sumpter, *Is the golden ratio a universal constant for self-replication?* PLOS ONE, 13(7): e0200601, 2018.

[-] **Y Liu***, *The artificial ecosystem: number soup (part II)*, arXiv:1801.04916, 2018.

[6] **Y Liu***, D Sumpter, *Insights into resource consumption, cross-feeding, system collapse, stability and biodiversity from an artificial ecosystem*, J. R. Soc. Interface, 14(126): 20160816, 2017.

Plasma Physics / Physics in general

[5] **Y Liu***, ZT Wang, YX Long, JQ Dong, CJ Tang, *Nonideal fishbone instability excited by trapped* energetic *electrons*, Phys. Plasmas, 20: 032507, 2013.

[4] ML Mou, **Y Liu**, ZT Wang, SY Chen, CJ Tang*, *Prompt loss of energetic ion in Tokamak*, Acta. Phys. Sin., 63(16): 165201, 2014. (in Chinese, with English abstract)

[3] ZT Wang*, L Wang, YX Long, JQ Dong, ZX He, **Y Liu**, CJ Tang, *Shaping effects of the e-fishbone in Tokamaks*, Plasma Sci. Technol., 15(1): 12-16, 2013.

[2] ZT Wang*, L Wang, LX Long, JQ Dong, ZX He, **Y Liu**, CJ Tang, *Gyrokinetics for high*-frequency *modes in tokamaks*, Phys. Plasmas, 19(7): 072110, 2012.

[1] SY Chen, BB Hong, **Y Liu**, etc., *Numerical analysis on the synergy between electron cyclotron current drive and lower hybrid current drive in Tokamak*, Plasma Phys. Control. Fusion, 54: 11, 2012.

[-] **Y Liu**, CJ Tang, *Rutherford scattering and its computer simulation*, Atomic Energy Science and Technology, 44(11): 1281-1286, 2010. (in Chinese, with English abstract)

Selected Academic Activities

- Invited talk at China University of Mining and Technology, Xuzhou, China, Virtual 2022.05
- Invited talk at the Fifth Affiliated Hospital Sun Yat-sen University, Zhuhai, China 2021.12

- Invited talk at University of Modena and Reggio Emilia, Italy, Virtual 2021.11
- Invited talk at Tianyuan Mathematical Center, Xiamen University 2021.09
- Academic visit to Institute of Biophysics, Chinese Academy of Sciences, Beijing, China 2021.07
- Invited talk at Center for Quantitative Biology, **Peking University**, Virtual 2021.03
- **Interviewed by chemistryworld.com** (Royal Society of Chemistry) to comment on the recent developments of self-replicating molecules / origin of life researches 2020.07
- Interdisciplinary Origin of Life workshop, Virtual 2020.05
- Workshop on growth and pattern formation - a celebration of Philip Maini's 60th birthday, Mathematical Institute, University of Oxford, UK 2019.09
- **Invited speaker** (by Prof. Paul Rainey) at conference "Breathing life into chemistry", **Max Planck Institute (MPI) for evolutionary biology**, Plön, Germany 2019.06
- Invited talk (by Dr. Chaitanya Gokhale) at MPI for evolutionary biology, Plön, Germany 2019.02
- Workshop 1010: The Maths of Biology, Stockholm, Sweden 2018.10
- 1st International Symposium on Building a Synthetic Cell, Delft, Netherlands 2018.08
- 9th Swedish Meeting on Mathematics in Biology (talk), Västerås, Sweden 2017.12
- Academic visit to Centre for Models of Life, **Niels Bohr Institute**, Copenhagen, Denmark, with Prof. Kim Sneppen 2017.10
- Summer School on Statistical Physics of Complex Systems, IFISC, Mallorca, Spain 2017.06
- 8th Swedish Meeting for Mathematical Biology (talk), Göteborg, Sweden 2016.11
- Workshop on Applied Mathematics and Statistics (talk), Krusenberg, Sweden 2016.10
- 10th European Conference on Mathematical and Theoretical Biology, Nottingham, UK 2016.07
- Visiting PhD student, **Section for Science of Complex System** in Medical University of Vienna, Vienna, Austria, with Prof. Stefan Thurner 2015.10 - 12
- 2015 Congress of the European Society for Evolutionary Biology, Lausanne, Switzerland 2015.08
- Summer School Dynamics of Multi-Level System, **MPI**, Dresden, Germany 2015.06
- 2014 Complex Systems Summer School, **Santa Fe Institute**, New Mexico, USA 2014.06

Academic Service & Review

- Reviewer for:
  Journal of the Royal Society Interface, Cell Division, New Journal of Physics, Annals of the New York Academy of Sciences, International Journal of Astrobiology, etc.
- Organizing 2021 Youth Forum of Guangdong-HongKong-Macao University Alliance for Interdisciplinary Sciences and Computation, Zhuhai, China 2021.11

Supervision & Teaching

- Online course "Introduction to Complex Systems (Python)" (open to public), Swarma Campus 2022.07 - 2022.08
- **Full lecturer, PhD course** "Advances in Complexity Science", Beijing Normal University at Zhuhai 2022.02 - 2022.06
- Teaching assistant (TA), "Python Introduction" part in the bachelor course "Metabolism" (60 students), University of Groningen 2019.04

- **Supervisor** of Daniel Hjerpe for his **master thesis** “The destruction of life in a self-replicating system”, Uppsala University (UU) 2017.09 - 2017.12
- **Full lecturer, master course “Modelling Complex Systems” (10 credits course, 50 stud.)**, UU 2017.03
- TA, bachelor course “Linear Algebra II” (60 stud.), UU 2017.09
- TA, bachelor course “Linear Algebra II” (60 stud.), UU 2016.09
- TA, master course “Modelling Complex Systems” (60 stud.), UU 2016.04
- TA, master course “Modelling Complex Systems” (60 stud.), UU 2015.04
- TA, bachelor “Electromagnetic Field Theory” (100 stud.), Sichuan Univ. (SU) 2012.02
- TA, bachelor course “MATLAB Programming” (100 stud.), SU 2010.09