

# Yingying Xu

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## Current status

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**Special Postdoctoral researcher of Basic Science (SPDR) in RIKEN:** 2020 April-  
**RIKEN Interdisciplinary Theoretical and Mathematical Sciences(iTHEMS) Program** 2021 April-  
Center for Advanced Intelligence Project (AIP), RIKEN, Japan  
Mathematical Statistics team, Hidetoshi Shimodaira group 2020 April – 2021 March

## Past research positions

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**Postdoctoral researcher, Tokyo Institute of Technology** 2019 May - 2020 March  
Kabashima Yoshiyuki Lab.  
Department of Mathematical and Computing Science,  
School of Computing,  
Focus: Developing methodologies for theoretical analysis  
through statistical physics for mathematical and information  
processing problems such like optimization problem of a discrete system.

**Postdoctoral researcher, Aalto university & Helsinki University** 2016 April – 2019 April  
Aalto University, School of Science, Department of Computer Science, Finland  
The Finnish Centre of Excellence in Computational Inference Research (COIN);  
Helsinki University, Computer science department, Finland  
Focus: genome-wide epistasis analysis by direct-coupling analysis model

## Technical advisor for companies

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**Sigma-i** 2019 July---2020 March  
Focus: Quantum computer, quantum annealing, user company consulting  
Website: <https://sigmailab.com>

**MI-6** 2019 September—2019 December  
Focus: Material information  
Website: <https://mi-6.co.jp>



## Research Collaboration visit

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Lenka Zdeborova,  
Institut de Physique Theorique, CEA, Saclay, France      **2014-2015**

Ayaka Sakata  
The Institute of Statistical Mathematics, Tokyo, Japan      **2017 June. – Jul.**

Haijun Zhou  
Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing, China      **2016**

## Education

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**PhD&Master**      **2011 APR – 2016 March**  
Department of Computational Intelligence and Systems Science,  
Tokyo Institute of Technology  
Kabashima Yoshiyuki lab  
Focus: Statistical mechanics physics--Replica Method, Belief Propagation Algorithm  
Project: Statistical mechanics approach to 1-bit Compressive Sensing

**Bachelor**      **2007 APR –2011 MAR**  
Department of Physics,  
Tokyo Institute of Technology,  
Nishimori Hidetoshi lab (2010-2011)  
Focus: Statistical mechanics physics--Spin Glass theory  
Graduation thesis: "The possibility of Spin-Glass Phase in Random Fields"

**High school**      **2002 SEPT –2005 JUN**  
Wuhan foreign Language School, China

## Scholarships&Fundings

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Japan Society for the Promotion of Science (JSPS) research fellowship DC2, 2014-2016  
Rotary Yoneyama Memorial Foundation, 2012-2013  
Foundation of Seiho scholarship, 2010-2011



Japan Student Services Organization, 2007-2008

## Award

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Best poster award, at the master's poster session 2013,  
Department of computational intelligence and systems science, Tokyo Institute of Technology

## Activities

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### Internship

**2011 Jun. – Aug.**

Department of Applied Physics and Photonics, Vrije Universiteit Brussel, Belgium  
Project: 3-D display modeling  
Organized by IAESTE

### Exchange study

**2012 Sep. – 2012 Dec.**

Institute of Neuroinformatics and Physics  
University and Swiss Federal Institute of Technology Zurich, Switzerland  
Ruedi Stoop group  
Focus: Dynamical systems in biology

## Language Skills

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Chinese: native  
Japanese: fluent, studied Japanese over ten years, Passed level 1 in 2004  
English: fluent



## Main Publications

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1. Yingying Xu and Yoshiyuki Kabashima,  
"Statistical mechanics approach to 1-bit compressed sensing",  
Journal of Statistical Mechanics: Theory and Experiment, P02041(1-22), February, 2013.
2. Yingying Xu, Yoshiyuki Kabashima, Lenka Zdeborova,  
"Bayesian signal reconstruction for 1-bit compressed sensing",  
Journal of Statistical Mechanics: Theory and Experiment, P11015(1-23), November, 2014.
3. Yingying Xu and Yoshiyuki Kabashima,  
Statistical mechanics analysis of thresholding 1-bit compressed sensing  
Journal of Statistical Mechanics: Theory and Experiment, P083405(1-16), August, 2016.
4. Marcin J. Skwark, Nicholas J Croucher, Santeri Puranen, Claire Chewapreecha, Maiju Pesonen, Yingying Xu, Paul Turner, Simon R. Harris, Julian Parkhill, Stephen D. Bentley, Erik Aurell, Jukka Corander,  
"Interacting networks of resistance, virulence and core machinery genes identified by genome-wide epistasis analysis",  
PLOS Genetics, 13(2): e1006508. doi:10.1371/journal.pgen.1006508, February 16, 2017.
5. Yingying Xu, Erik Aurell, Jukka Corander and Yoshiyuki Kabashima  
"Statistical properties of interaction parameter estimates in direct couplings analysis"  
arXiv:1704.01459.
6. Santeri Puranen, Maiju Pesonen, Johan Pensar, Yingying Xu, John A. Lees, Stephen D. Bentley, Nicholas Croucher, Jukka Corander, Erik Aurell,  
"SuperDCA for genome-wide epistasis analysis",  
Microbial Genomics, 2018 4, doi:10.1099/mgen.0.000184.
7. Ayaka Sakata and Yingying Xu  
"Approximate message passing for nonconvex sparse regularization with stability and asymptotic analysis",  
Journal of Statistical Mechanics: Theory and Experiment, Vol. 2018, No. 3, pp. P033404(1-36), February, 2018
8. Yingying Xu, Santeri Puranen, Jukka Corander and Yoshiyuki Kabashima  
"Inverse finite-size scaling for high-dimensional significance analysis",  
Physical Review E, 97, 062112, Published 6 June 2018
9. Johan Pensar, Santeri Puranen, Brian Arnold, Neil MacAlasdair, Juri Kuronen, Gerry Tonkin-Hill, Maiju Pesonen, Yingying Xu, Aleksí Sipola, Leonor Sánchez-Busó, John A Lees, Claire Chewapreecha, Stephen D Bentley, Simon R Harris, Julian Parkhill, Nicholas J Croucher, Jukka Corander,  
"Genome-wide epistasis and co-selection study using mutual information",  
Nucleic acids research, Oxford University Press, 47, 18, e112-e112, Oct 10 2019
10. Johan Pensar, Yingying Xu, Santeri Puranen, Maiju Pesonen, Yoshiyuki Kabashima, Jukka Corander,  
"High-dimensional structure learning of binary pairwise Markov networks: a comparative numerical study",  
Computational Statistics & Data Analysis, North-Holland, 141, 62-76, Jan 1 2020
11. Alia Abbara, Yoshiyuki Kabashima, Tomoyuki Obuchi, Yingying Xu,  
"Learning performance in inverse Ising problems with sparse teacher couplings",  
Journal of Statistical Mechanics: Theory and Experiment, (2020) 073402, July 3 2020
12. Kimmo Suotsalo, Yingying Xu, Jukka Corander, Johan Pensar,  
"High-dimensional structure learning of sparse vector autoregressive models using fractional marginal pseudo-likelihood",  
arXiv:2011.01484v1, Nov 3 2020