# Dr Cheng Ye

Department of Computer Science, Royal Holloway, University of London
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## Appointments Held

02.2017 - 04.2017 Laboratory Associate in GersteinLab
Department of Molecular Biophysics and Biochemistry, Yale University, US

- Research Topics: network-based analysis of 3D genome organisation

09.2016 - present Post-doctoral Research Assistant in PaccanaroLab
Department of Computer Science, Royal Holloway, University of London, UK

- Principal Investigator: Professor Alberto Paccanaro
- Research Topics: network mechanism of translational control of stress response in *Arabidopsis thaliana*, network approach to GWAS data analysis

## Education

2012 - 2016 PhD in Computer Science, University of York, UK

- Thesis Title: Entropic Characterization and Time Evolution of Complex Networks
  - thesis nominated for 2017 BCS/CPHC Distinguished Dissertation award
- Supervisor: Professor Edwin Hancock
- Synopsis: The study of complex networks has received a considerable interest in recent years as they provide convenient models for many large-scale systems in biology, physics and the social sciences. This thesis specifically centres on the entropic characterization and time evolution of complex networks. We provide an approximation to the von Neumann entropy for directed graphs, which can be expressed in terms of simple graph statistics. The thesis further investigates a number of applications of the approximate entropy for solving problems in network analysis and pattern recognition. Turning attention to dynamic complex networks, we propose a thermodynamic framework for analysing their structural evolution using ideas from algebraic graph theory and statistical mechanics. Finally, the thesis develops a generative model for capturing the underlying time-evolving network structure by adopting an information theoretic approach. The experiments demonstrate the effectiveness of our methodologies in understanding the structure, function and dynamics of complex networks from both financial and biological areas.

2011 - 2012 MSc in Financial Mathematics, University of Exeter, UK

- Dissertation Title: Numerical Solutions for Stochastic Ordinary Differential Equations
- Main Modules: Financial Modelling, Pattern Recognition, Research Methodology, Methods for Stochastics and Finance, Analysis and Computation for Finance, Mathematical Theory of Option Pricing

2007 - 2011 BSc in Information and Computing Science, Huazhong University of Science and Technology, PR China

- Dissertation Title: The Interest Analysis of Game Theory between Central Government, Local Government, Industry Association and the Public
- Main Modules: Mathematical Analysis, Advanced Programming Language (C), Ordinary Differential Equations, Probability Theory, Numerical Approximation, Operation Research, Numerical Methods for ODEs, Partial Differential Equations, Mathematical Modelling, Numerical Algebra, Optimization Theory, Parallel Computation, Numerical Methods for PDEs, Stochastic Processes, Time Series Analysis

## Teaching Experience

- Demonstrated modules and marked problem sheets
- Marked assessment and provided feedback

## Administration

- Experienced in research proposal writing and report writing
- Assisted in planning and organizing scientific conferences (SIMBAD 2013 and CAIP 2013)

## Skills

- Database: proficient in managing and analysing large-scale data
- IT: proficient in Microsoft Office Tool Suite, competent user of Excel and Powerpoint
- Programming: proficient in MATLAB, familiar with C, C++, R, etc.
- Communication: fluent in verbal and academic written English
- Networking: worked closely with internal and external contacts (University of São Paulo and Yale University)

## Conferences Attended

- 2nd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD), York, UK, 2013
- 15th International Conference on Computer Analysis of Images and Patterns (CAIP), York, UK, 2013
- European Conference on Complex Systems (ECCS), Lucca, Italy, 2014
- 10th IAPR-TC15 Workshop on Graph-based Representations in Pattern Recognition (GbR), Beijing, China, 2015

## Awards

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| 2009 | Individual Scholarship (awarded to top 10% students), HUST, China |
| 2012 - 2015 | Departmental Overseas Research Scholarship, Department of Computer Science, University of York |

## Publications

### Journal Articles

- Cheng Ye, Richard C. Wilson and Edwin R. Hancock: Network analysis using entropy component analysis. In *Journal of Complex Networks*, 2017.
- Cheng Ye, César H. Comin, Thomas K. DM. Peron, Filipi N. Silva, Francisco A. Rodrigues, Luciano da F. Costa, Andrea Torsello and Edwin R. Hancock: Thermodynamic characterization of networks using graph polynomials. In *Physical Review E*, Volume 92, Issue 3, Number 032810, 2015.
- Cheng Ye, Richard C. Wilson, César H. Comin, Luciano da F. Costa, and Edwin R. Hancock: Approximate von Neumann entropy for directed graphs. In *Physical Review E*, Volume 89, Issue 5, Number 052804, 2014.
- Filipi N. Silva, César H. Comin, Thomas K. DM. Peron, Francisco A. Rodrigues, Cheng Ye, Richard C. Wilson, Edwin Hancock and Luciano da F. Costa: Concentric network symmetry. In *Information Sciences*, Volume 333, Pages 61-80, 2016.

## Conference Articles

- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Analyzing graph time series using a generative model. In Proceedings of *23rd International Conference on Pattern Recognition (ICPR)*, 2016, Cancun, Mexico.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Correlation Network Evolution Using Mean Reversion Autoregression. In Proceedings of *IAPR joint International Workshop in Statistical Techniques in Pattern Recognition (SPR) and Structural and Syntactic Pattern Recognition (SSPR)*, 2016, Merida, Mexico.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Thermodynamics of Dynamic Complex Networks. In Presentations of *International School and Conference on Network Science (NetSci)*, 2015, Zaragoza, Spain.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Thermodynamics of Time Evolving Networks. In Proceedings of *10th IAPR-TC15 Workshop on Graph-based Representations in Pattern Recognition (GbR)*, 2015, Beijing, China. Pages 315-324.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: An Entropic Edge Assortativity Measure. In Proceedings of *10th IAPR-TC15 Workshop on Graph-based Representations in Pattern Recognition (GbR)*, 2015, Beijing, China. Pages 23-33.
- Cheng Ye, Richard C. Wilson, César H. Comin, Luciano da F. Costa, Edwin R. Hancock: Approximating the Von Neumann Entropy for Directed Graphs. In Presentations of *European Conference on Complex Systems (ECCS)*, 2014, Lucca, Italy.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Graph Characterization from Entropy Component Analysis. In Proceedings of *22nd International Conference on Pattern Recognition (ICPR)*, 2014, Stockholm, Sweden. Pages 3845-3850.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Entropic Graph Embedding via Multivariate Degree Distributions. In Proceedings of *IAPR joint International Workshop in Statistical Techniques in Pattern Recognition (SPR) and Structural and Syntactic Pattern Recognition (SSPR)*, 2014, Joensuu, Finland. Pages 163-172.
- Cheng Ye, Richard C. Wilson, Edwin R. Hancock: Heterogeneity Index for Directed Graphs. In Proceedings of *15th International Conference on Computer Analysis of Images and Patterns (CAIP)*, 2013, York, UK. Pages 424-431.
- Cheng Ye, Richard C. Wilson, César H. Comin, Luciano da F. Costa, Edwin R. Hancock: Entropy and Heterogeneity Measures for Directed Graphs. In Proceedings of *2nd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD)*, 2013, York, UK. Pages 219-234.