

HAROLD SOH

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Education

PhD Candidate, Imperial College London, London, UK, Degree Expected Oct 2012

Thesis Topic: The Assistive Robot Transport For Youngsters (ARTY)

Advisor: Dr. Yiannis Demiris

Masters, Software Eng., Melbourne University, Melbourne, Australia, Mar 2006

Thesis Topic: A Fast, Convergent Multi-objective Evolutionary Algorithm.

GPA: 86.71% (H1/First Class)

Advisor: Dr. Michael Kirley

BAS, Computer Science & Economics, University of California, Davis, USA, June 2004

GPA: 3.47/4.00 (86.75%)

Awards and Achievements

Khazanah Global Scholarship, 2009-Present

The University of California Regents Scholarship, 2000-2004

Dean's Honors List, Fall 2003-Spring 2004

Integrated Studies, Freshman Honors Program, 2000

Publications (Author/Co-author)

6 Journal Papers, 6 Conference Papers, 3 Workshop Papers

2 Book Chapters

Co-authored 2 grant-winning research proposals

Recent Work Experience

Chief Graduate Teaching Assistant, Imperial College London, UK, Nov 2009-Present

Organised and managed Professional Engineering (presentations) tutorial sessions.

Researcher, The Institute of High Performance Computing, Singapore, Feb 2006-Jul 2009

Research and development in computational epidemiology, evolutionary algorithms, data visualisation and high-performance systems.

Research Assistant, University of Melbourne, Melbourne, Australia, Jun 2005-Dec 2005

Research and development in evolutionary algorithms and high-performance grid systems.

Associate, Ernst and Young, Kuala Lumpur, Malaysia, Sep 2004-Dec 2004

Contributed in the technical systems audit of a Fortune 500 company, an international bank and a civil engineering firm.

Technical Skills

Proficient in: C/C++, Python, MATLAB/GNU Octave, Parallel Programming with MPI and OpenMP, UNIX Bash Shell Scripting, Microsoft Office Products, Windows, Mac OSX and Linux Operating Systems, LaTeX.

Familiarity with: RapidMiner

Selected Volunteer and Outreach

Technology Chair and Technical Expert, Space Science and Engineering Foundation,

London, UK, April 2010-Present

Volunteer, Next Generation Project @ Imperial, London, UK, Dec 2009-Present

Volunteer, Whizz Kidz, London, UK, Jan 2010-Present

Harold S. H. Soh

CONTACT INFORMATION	Department of Electrical and Electronic Engineering Imperial College London South Kensington Campus, London SW7 2AZ United Kingdom	<i>Voice:</i> (44) 0777 4963 779 <i>Email:</i> haroldsoh@imperial.ac.uk <i>www:</i> www.haroldsoh.com
RESEARCH INTERESTS	Assistive Robotics, Human-Robot Interaction, Machine Learning, Cognitive Systems and Complex Systems	
EDUCATION	Imperial College London , London, United Kingdom PhD. Candidate, Artificial Intelligence and Robotics , (expected graduation date: Oct 2012) <ul style="list-style-type: none">• Thesis Topic: The Assistive Robot Transport For Youngsters (ARTY): a <i>safe</i>, intelligent paediatric wheelchair.• Advisor: Dr. Yiannis Demiris The University of Melbourne , Victoria, Australia. M.S.S.E, Software Systems Engineering, March 2006 <ul style="list-style-type: none">• Minor Thesis: A Fast, Convergent Multi-objective Evolutionary Algorithm• Advisor: Dr. Michael Kirley• Coursework Grade: 86.71% (H1/First Class) The University of California, Davis , California, USA. B.A.S, June 2004 <ul style="list-style-type: none">• Double major in Computer Science and Economics.• GPA: 3.47/4.00 (86.75%).	
AWARDS	The Khazanah Foundation (Yayasan Khazanah) <ul style="list-style-type: none">• The Khazanah Global Scholarship, 2009-present. The University of California <ul style="list-style-type: none">• The University of California Regents Scholarship, 2000-2004.• Dean's Honors List, 2003-2004.• Integrated Studies, Freshman Honors Program, 2000.	
JOURNAL PUBLICATIONS	Harold Soh , Sonja Lim, Tianyou Zhang, Xiuju Fu, Gary Kee Khoon Lee, Terence Gih Guang Hung, Pan Dic, Silvester Prakasam and Limsoon Wong, <i>Weighted complex network analysis of travel routes on the Singapore public transportation system</i> , Physica A: Statistical Mechanics and its Applications, 2010. [2009 5-Year Impact Factor: 1.643] Tianyou Zhang, Xiuju Fu, Chee Keong Kwoh, Gaoxi Xiao, Limsoon Wong, Stefan Ma, Harold Soh , Gary Kee Khoon Lee, Terence Hung and Michael Lees, <i>Temporal factors in school closure policy for mitigating the spread of influenza</i> , Journal of Public Health Policy, 2011. (advance online publication) [2009 5-year Impact Factor: 1.558]	

Harold Soh, Ong Yew Soon, Nguyen Quoc Chinh, Nguyen Quang Huy, Mohamed Habibullah, Terence Hung and Kuo Jer Lai. *Discovering Unique, Low-Energy Pure Water Isomers: Memetic Optimization and Landscape Analysis*, IEEE Transactions on Evolutionary Computation, 2010. [2009 5-Year Impact Factor: **7.621**]

Shi Xiao, Gaoxi Xiao, Tee Hiang Cheng , Steven Ma, Xiuju Fu and **Harold Soh**, *Robustness of scale-free networks under re-wiring operations*, Europhysics Letters, 2010. [2008 5-Year Impact Factor: **2.137**]

Nguyen Quoc Chinh, Ong Yew Soon, **Harold Soh** and Kuo Jer Lai. A Multi-scale approach to explore the potential energy surface of water clusters $(\text{H}_2\text{O})_n$ $n \leq 8$, Journal of Chemical Physics A, 2008. [2008 5-Year Impact Factor: **2.889**]

Mark Schreiber, Edward Holmes, Swee Ong, **Harold Soh**, Wei Liu, Lukas Tanner, Pauline Aw, Hwee Tan, Lee-Ching Ng, Yee-Sin Leo, Jenny Low, Adrian Ong, Eng Eong Ooi, Subhash Vasudevan, and Martin Hibberd. *Genomic Epidemiology of a Dengue Virus Epidemic in Urban Singapore*, Journal of Virology, 2008. [2008 5-Year Impact Factor: **5.135**]

CONFERENCE
PUBLICATIONS

Harold Soh and Yiannis Demiris. *Evolving Multi-Reward Partially Observable Markov Decision Processes (MR-POMDPs)*, GECCO '11: Genetic and Evolutionary Computation Conference, Dublin, 2011. (Accepted)

Harold Soh, Ong Yew Soon, Mohamed Salahuddin, Terence Hung and Lee Bu Sung. *Playing in the Objective Space: Coupled Approximators for Multi-Objective Optimization*, IEEE Symposium on Multi-Criteria Decision Making, Honolulu, Hawaii, USA, 2007.

Xiuju Fu, Christina Liew, Terence Hung, **Harold Soh**, Gary Lee and Leeching Ng. *Time-Series Infectious Disease Data Analysis Using SVM and Genetic Algorithm*, IEEE Congress on Evolutionary Computation, Singapore, 2007.

Mohamed Salahuddin, Terence Hung, **Harold Soh**, Endang Sulaiman, Ong Yew Soon, Lee Bu Sung, Ren Yunxia. *Grid-based PSE for Engineering of Materials (GPEM)*, Seventh IEEE International Symposium on Cluster Computing and the Grid, Rio de Janeiro, Brazil, 2007.

Harold Soh and Michael Kirley, *moPGA: Towards a New Generation of Multi-Objective Optimization*, IEEE Congress on Evolutionary Computation, Vancouver, Canada, 2006.

Harold Soh, Shazia Haque, Weili Liao, Krishna Nadiminti and Rajkumar Buyya, *GTPE: A Thread Programming Environment for the Grid*, Proceedings of the 13th International Conference on Advanced Computing & Communications (ADCOM 2005), Coimbatore, India, 2005.

WORKSHOP
PAPERS

Harold Soh and Yiannis Demiris. *Multi-Reward Policies for Medical Applications: Anthrax Attacks and Smart Wheelchairs*, MedGEC 2011 : 7th GECCO Workshop on Medical Applications of Genetic and Evolutionary Computation, 2011 (Accepted)

Harold Soh and Yiannis Demiris. *Involving Children in the Development of a Safe, Smart, Paediatric Wheelchair*, HRI Pioneers Workshop at the 6th IEEE/ACM Conference on Human Robot Interaction, March, 2011.

Thorsten M. Riechers, Shyh-hao Kuo, Rick Siow Mong Goh, **Harold Soh**, Terence Hung and Abid M. Malik, *A case study on dynamic kernel adaptation in a component-based infectious disease simulator*, Workshop on Component-Based High Performance Computing (CBHPC), 2009.

BOOK CHAPTERS Yan Wu, Gary Lee, Xiuju Fu, Terence Hung and **Harold Soh**, *Mining Weather Information in Dengue Outbreaks: Predicting future cases based on Wavelet, SVM and GA*, Advances in Electrical Engineering and Computational Science, Springer, 2009.

Harold Soh, Shazia Haque, Weili Liao and Rajkumar Buyya, *Grid Programming Models and Environments*, Advanced Parallel and Distributed Computing: Evaluation, Improvement and Practice, Yuanshun Dai, Yi Pan, Rajive Raje (eds), Nova Science Publishers, USA, 2006.

WORK
EXPERIENCE

Imperial College London, London, UK

Chief Graduate Teaching Assistant **Nov 2009 to Present**

- Organized and managed Technical Communication tutorial sessions for first-year undergraduates.

The Institute of High Performance Computing, Agency for Science, Technology and Research (A*STAR), Singapore

Research Officer **Feb 2006 to March 2008**

Senior Research Officer **April 2008 to July 2009**

Co-Principal Investigator, **Individual-based Modelling of Avian Influenza in Singapore**, Sept 2007 to July 2009.

- Developed mathematical and computational models of pandemic influenza spread in Singapore using simulation and random-graph models.
- Co-authored BMRC Grant Application (Awarded for period 2007 to 2009).

Co-Principal Investigator, **Transmission Modelling of Dengue**, June 2007 to July 2009

- Developed Bayesian model and classification scheme to identify transmissions based on genomic and epidemiological data.
- Co-author for A*STAR Cross Council Grant Application (Awarded 2009 to 2012)

Project Officer, **Grid-based Problem Solving Environment for the Engineering of Materials (GPEM)**, Feb 2006 to Dec 2007

- Developed high-performance memetic algorithm for sampling meta-stable structures on the potential energy surface of pure-water clusters.
- Formulated and implemented “Coupled Approximators” for improving evolutionary algorithms.
- Integrated optimisation algorithms with Grid framework for large-scale optimisation studies with COMSOL.

University of Melbourne, Victoria, Australia

Research Assistant **June 2005 to Dec 2005**

Dept. of Computer Science and Software Engineering

- Supervisor: Dr. Michael Kirley.

- Developed parallel genetic algorithm with C++.
- Extended project to a minor thesis on a linkage-learning multi-objective evolutionary algorithm.

GRIDS Lab, Dept. of Computer Science and Software Engineering

- Supervisor: Dr. Rajkumar Buyya
- Developed a thread-based Grid programming environment for rapid prototyping.
- Lead author for a book chapter on Grid programming environments.

Ernst & Young, Kuala Lumpur, Malaysia.

Associate

Sept 2004 to Dec 2004

Technology & Security Risk Services

- Contributed in the technical systems audit of the largest petrochemical corporation in Malaysia, a large foreign bank and a civil engineering company.

University of California, Davis, California, USA.

Research Assistant

Oct 2002 to June 2004

Dept. of Evolution and Ecology

- Supervisor: Professor Robert Pearcy
- Developed scientific software to model photosynthesis and light response in plants. Applications developed (e.g. Winfleck) are used for education and research in USA and Japan.

PRESENTATIONS

Human-Centered Robotics, United Kingdom-Malaysia Engineering Conference, University College London, London, UK, 2009.

Introduction to Modelling and Simulation, IHPC Seminar Series, Singapore, 2009.

Infectious Disease Modelling and Analysis: Pandemic Influenza and Dengue, Scientific Advisory Board Session, Institute of High Performance Computing, 2009.

Individual-based Modelling of Pandemic Influenza, H1N1 Update to Permanent Secretary, Ministry of Health and Senior Ministry Officials, 2009.

Computational Techniques for Modelling, Simulating and Analysing Infectious Diseases, Scientific Advisory Board Session, Institute of High Performance Computing, 2008.

Addressing the Dengue Problem with Genomics and Computational Science, Inaugural A*STAR Scientific Conference, Singapore, 2008.

Computational Techniques for Modelling, Simulating and Analysing Infectious Diseases, Scientific Advisory Board Meeting, Institute of High Performance Computing, 2008.

High-Performance Computational Methods for Biomedical Science: Data Mining, Optimization and Resource Efficient Computing, Workshop on Advanced Computing for the Biomedical Sciences, Genome Institute of Singapore, 2008.

Playing in the Objective Space: Coupled Approximators for Multi-Objective Optimization, IEEE Symposium on Multi-Criteria Decision Making, Honolulu, Hawaii, USA, 2007.

Visualization in Research and Everyday Life, Digital Modeling, IHPC Seminar Series, Singapore, 2007.

moPGA: Towards a New Generation of Multi-Objective Optimization, IEEE Congress on Evolutionary Computation, Vancouver, Canada, 2006. [**Best Session Presentation Award**]

VOLUNTEER AND OUTREACH Technology Chair, **Space Science and Engineering Foundation (SSEF)**, London, United Kingdom, Nov 2010 - Present

Technical Expert, Automation Engineering, **UK Space Settlement Design Competition**, London, United Kingdom, April 2010.

- Provided technical information on automation engineering to advanced high-school students participating in the UK Space Settlement Design Competition.
- Served on the judging panel (along with professionals from Imperial College and NASA) responsible for evaluating the final proposals.

Volunteer, **Next Generation Project**, London, United Kingdom, 2009-Present.

- Developed and demonstrated science experiments to students in Years 4-6 (Robotics, Plastics).

Volunteer, **Whizz Kidz**, London, United Kingdom, 2010-Present.

- Life Skillz: worked with children with special needs to improve their communication, social and thinking skills.

Lecturer, **Raffles Junior college Extra-Curricular Class, Singapore**, 2008.

- Conducted a one-day class on scientific modelling and visualization with Processing.

Committee Member, **HPCQuest**, Singapore, 2006 and 2007.

- Problem-designer, mentor and judge for a 12-week problem-solving and programming competition for Junior College (A-Level) students.

Volunteer, **IHPC Reach-Out Initiative**, Singapore, 2006-2008.

- Mentored mentally-challenged and disadvantaged young adults from Tanglin school at a two-day camp.
- Set up a Linux computer lab and taught basic computer skills to children (aged 8-12) at Melrose Place, Children's Aid, Singapore.

Volunteer, **Student Care Service**, Singapore, 2006.

- Read and taught English to an under-privileged ten-year old boy and his two siblings.

ACADEMIC SERVICE

Peer reviewer for:

- **IEEE Transactions on Evolutionary Computation.**
- **2008 IEEE International Conference on Systems, Man and Cybernetics**, Singapore, 2008.

OTHER SERVICES

Chair/Advisor, **IHPC Wiki Committee**, Singapore, 2006-2007/2007-2009.

- Founded, developed and promoted the wiki for researchers to share documentation and technical knowledge.

Technical Director, **Picnic Day**, University of California, Davis, USA 2002.

- Lead developer for the Picnic Day website.
- Provided support for audio equipment used in activities catering to 50,000 visitors.

TECHNICAL ABILITIES

Proficient in:

- C/C++.
- MATLAB/GNU Octave.
- Parallel Programming with MPI and OpenMP.
- UNIX Bash Shell Scripting.
- Windows, Mac OSX and Linux Operating Systems.
- L^AT_EX.

Familiarity with R, YALE, WEKA and Mathematica.

AFFILIATIONS

Member, **American Association for the Advancement of Science (AAAS)**, 2007-Present.

Student Member, **Institute of Electrical and Electronics Engineers (IEEE)**, 2009-Present.

IEEE Robotics and Automation Society, 2009-Present.

IEEE Computational Intelligence Society, 2009-Present.

Student Member, **Association for Computing Machinery (ACM)**, 2009-Present.

REFERENCES

Dr. Yiannis Demiris

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