

Robert Mattila

Osquldas väg 10
100 44 Stockholm
KTH EE-AC, Sweden

March 8, 2016

rmattila@kth.se

076 - 201 405 6

Research Interests

- Identification, control and inference in stochastic dynamical systems;
- Hidden Markov models;
- (Partially observed) Markov decision processes;
- Machine learning and optimization;
- Applications to social networks, next-generation health care and medicine.

Education

- **KTH Royal Institute of Technology** Stockholm, Sweden
PhD Automatic Control 2015 - 2020 (Projected)
 - Supervisors: Prof. Bo Wahlberg and Assoc. Prof Cristian R. Rojas.
 - Topic: Identification and control of hidden Markov models.
- **KTH Royal Institute of Technology** Stockholm, Sweden
B.Sc. Engineering Physics, M.Sc. Systems, Control and Robotics 2010 - 2015
 - The Swedish degree of *Civilingenjör i Teknisk Fysik*.
 - The graduation date was one semester earlier than nominal time.
 - B.Sc. GPA of 4.98/5.0 and M.Sc. GPA of 5.0/5.0 .
- **UCM, Universidad Complutense de Madrid** Madrid, Spain
ERASMUS Exchange Studies Spring 2013
 - All (five) courses taken were taught in Spanish (including reading material).
 - GPA of 8.13/10.0 .
- **THG, Thorildsplans gymnasium** Stockholm, Sweden
Natural Sciences with specialization on Mathematics and Computer Science 2007 - 2010

Academic Experience

- **UBC, University of British Columbia** Vancouver, Canada
Invited Researcher by Prof. Vikram Krishnamurthy Summer 2015
- **UBC, University of British Columbia** Vancouver, Canada
Master Thesis with Prof. Vikram Krishnamurthy Autumn 2014
- **Caltech, California Institute of Technology** Pasadena, USA
SURF in the Control and Dynamical Systems (CDS) Group Summer 2014
 - Supervisors: Prof. Richard M. Murray and Asst. Prof. Yilin Mo
 - Developed an improved abstraction algorithm for the correct-by-construction controller synthesis framework TuLiP.

- **KTH, Royal Institute of Technology** Stockholm, Sweden
Research Intern for Prof. Bo Wahlberg *Summer 2013*
- **ZJU, Zhejiang University** Hangzhou, China
Participated in the Joint Research Center of Photonics Workshop *Summer, 2012*
 - Implemented optical logic gates exploiting non-linearities in fibers.

Publications

Conferences

- Robert Mattila, Vikram Krishnamurthy and Bo Wahlberg, *Recursive Identification of Chain Dynamics in Hidden Markov Models Using Non-Negative Matrix Factorization*. In 54th IEEE Conference on Decision and Control, Osaka, Japan, 2015.
- Robert Mattila, Yilin Mo and Richard M. Murray, *An Iterative Abstraction Algorithm for Reactive Correct-by-Construction Controller Synthesis*. In 54th IEEE Conference on Decision and Control, Osaka, Japan, 2015.
- Robert Mattila, Cristian R. Rojas and Bo Wahlberg, *Evaluation of Spectral Learning for the Identification of Hidden Markov Models*. In 17th IFAC Symposium on System Identification (SYSID 2015), Beijing, China, 2015.

Other

- Robert Mattila, Vikram Krishnamurthy and Bo Wahlberg, *Recursive Method of Moments Identification of Hidden Markov Models using Convex Optimization*. Poster at the 2015 Workshop of the European Research Network on System Identification (ERNSI), September, Varberg, Sweden.
- Robert Mattila, *On Identification of Hidden Markov Models Using Spectral and Non-Negative Matrix Factorization Methods*. Master's thesis, KTH Royal Institute of Technology. Stockholm, Sweden, 2015. Supervisors: Prof. Bo Wahlberg and Assoc. Prof. Cristian R. Rojas.
- Robert Mattila, *Including Bathymetric Data in Autonomous Surface Vessels' Maneuvering Optimisation Tool*. Bachelor's thesis, KTH Royal Institute of Technology. Stockholm, Sweden, 2015. Supervisors: Prof. Juan Jiménez and José María Benítez.

Skills, Merits and Awards

- **Computer Skills:**
 - Programming:** MATLAB, Python, Java
 - Operating Systems:** OSX, Linux, Windows
 - Productivity:** L^AT_EX, git
- **Language:**
 - Native in Swedish
 - Fluent in English
 - B2/C1 in Spanish

- **Awards:**
 - Awarded the KTH Electrical Engineering Scholarship of Excellence (1 MSEK) in 2015.
 - Awarded a SURF scholarship from Caltech to work with Prof. Richard Murray in 2014.
 - Awarded the Henrik Göransson's Sandviken Scholarship and the KTH Student Scholarship (twice), for outstanding grades.
 - Participated in *Wallenbergs Fysikpris 2010* (Swedish qualifications for the International Physics Olympiad). Reached the final with the best result amongst all participants from Stockholm (in the qualification round) and placed 7th in the final.
 - Awarded scholarship for outstanding grades when graduating from THG.
- **KIBok** (www.kibok.se): Have founded and developed a marketplace for used textbooks for students at Karolinska Institutet. The environment used is Python with Django. Currently maintaining and hosting the website on a Raspberry Pi.
- Hold a Swedish driver's license (B).

Industry Experience

- **Stockholm Vatten AB** Stockholm, Sweden
Summer Intern *Summer 2011 and 2012*
 - Warehouse work including collecting and delivering items; cleaning and repairing machines; contacting customers; administrative work in the supply system Agresso.

Teaching

- **EH1010 Project Course in Electrical Engineering** KTH
Supervisor *Spring 2016*
- **EL1000 Automatic Control, General Course** KTH
Teaching Assistant *Autumn 2015*