

# EMMA TEGLING

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Institute for Data, Systems, and Society  
Massachusetts Institute of Technology  
77 Massachusetts Avenue  
Cambridge, MA 02139

Née Sjödin

Nationality: Swedish

Date of birth: 1988-09-04

## Education and research

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**Massachusetts Institute of Technology, Cambridge, MA**  
**Institute for Data, Systems, and Society (IDSS)**

**Aug 2019 – present**

**Postdoctoral Research Fellow**

Host: Prof. Ali Jadbabaie, Co-host: Prof. Munther Dahleh

**KTH Royal Institute of Technology, Stockholm, Sweden**  
**Division of Decision and Control Systems, EECS**

**Sep 2014 – Jul 2019**

**Ph.D. Electrical Engineering, 2019**

Thesis advisor: Prof. Henrik Sandberg, Co-advisor: Prof. Karl H. Johansson

**Tekn. Lic. (*Licentiate degree*) Electrical Engineering, 2016**

**UC Santa Barbara, Santa Barbara, CA**

**Apr - Jul 2015**

**Research exchange**

Advisor: Prof. Bassam Bamieh

**Johns Hopkins University, Baltimore, MD**

**Mar - Jul 2013**

**Research assistantship (M.Sc. thesis project),**

Advisor: Prof. Dennice F. Gayme

**California Institute of Technology, Pasadena, CA**

**Jun - Aug 2011**

**Research internship (SURF)**

Advisors: Prof. Steven Low, Dennice F. Gayme

**KTH Royal Institute of Technology, Stockholm, Sweden**

**Aug 2009 – Jun 2013**

**M.Sc. Engineering physics, 2013**

**B.Sc. Engineering physics, 2011**

**Berlin Institute of Technology, Berlin, Germany**

**Sep 2008 – Jul 2009**

**Exchange studies, Engineering Science**

## Industry experience

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**Ericsson Strategic Programs Practice, Stockholm, Sweden**

**Aug 2013 – Sep 2014**

**Business analyst**

- Corporate strategy: worked in a team to develop medium- to long-term strategy for business verticals, including smart grid and transportation segments
- Sales reinforcement: led implementation of renewed incentives for global sales force

**Scandinavian Risk Solutions, Stockholm, Sweden**

**Aug 2009 – Feb 2013**

**Consultant, part-time**

- Performed analyses for information security and business intelligence projects
- Developed tools in e.g. MS Excel and Qlikview to support business activities

**ABB FACTS (Flexible AC Transmission Systems), Västerås, Sweden**

**Jun - Aug 2012**

**Intern**

- Developed dimensioning tool for grid-scale battery-based energy storage system

## ABB Sustainable Talent Program, Västerås, Sweden

Jan - May 2012

### Participant in leadership and mentoring program

- Competitive program that gives insights to one of the world leaders in power and automation, with focus on networking and mentoring. Included leadership training.

## Other International Exchange

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### University of Newcastle, Newcastle, NSW, Australia

Apr - May 2019

#### Research visit (4 weeks)

Hosts: Richard H. Middleton, Maria Seron, Sonja Stuedli

Sponsored by: University of Newcastle / Australian Research Council

### Isaac Newton Institute, Cambridge, UK

Jan 2019

#### Research program (invited participant)

Sponsored by: Cambridge Philosophical Society

## Teaching and supervision

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### B.Sc. Level: Automatic Control, basic course. 2015, 2016, 2017, 2018

- Held exercise classes and laboratory exercises. Assisted in constructing and grading exams.

### M.Sc. Level: Automatic Control, project course (supervision of 3-5 students). 2015, 2016

- Projects: Scheduling of grid-scale energy storage (2015), Control of a solar gas turbine (2016)

#### Supervision:

- Hendrik Flamme (M.Sc. student). Project: Limitations of distributed integral control in power networks. Now Ph.D. student at RWTH Aachen. 2017.
- Christian Barbieri (M.Sc. student). Project: Scalable integral control in networks. 2019.

## Awards and Fellowships

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- **Swedish Research Council** International Postdoc Grant, 2019
- **Foundation Blanceflor Boncompagni Ludovisi, née Bildt** stipend, 2019
- **Cambridge Philosophical Society** Isaac Newton Bursary, 2019
- **Sweden-America Foundation** postdoctoral fellowship, 2019
- **Xylem** award for best M.Sc. Thesis in Electrical, Mechanical or Industrial Engineering, KTH, 2013
- **Henrik Göransson's** stipend for excellent study results, KTH, 2012
- **Travel awards:** Wallenberg foundation 2017, Lindstrand foundation 2017

## Invited seminars

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### 2019

- **University of Wisconsin, Madison**, Dept. of Electrical and Computer Engineering, Madison, WI, USA. (October)
- **University of Newcastle**, School of Electrical Engineering and Computing, Newcastle, NSW, Australia. (May)
- **CNRS Grenoble**, Gipsa-lab seminar series, Grenoble, France. (March)
- **Johns Hopkins University**, Laboratory for Computational Sensing and Robotics (LCSR) seminar series, Baltimore, MD, USA. (March)
- **MIT**, Laboratory for Information and Decision Systems (LIDS), Cambridge, MA, USA. (March)

### 2018

- **Hong Kong University**, Dept. of Electrical and Electronic Engineering, Hong Kong. (July)
- **Lund University**, Dept. of Automatic Control, Lund, Sweden. (March)

## 2017

- **University of Melbourne**, Dept. of Electrical and Electronic Engineering, Melbourne, VIC, Australia. (December)
- **UC Berkeley**, Electrical Engineering and Computer Science, Berkeley, CA, USA. (April)
- **UC Santa Barbara**, CCDC (Center for Control, Dynamical Systems and Computation) seminar series, Santa Barbara, CA, USA. (April)
- **University of Southern California**, Center for Systems and Control, Los Angeles, CA, USA. (April)

## 2016

- **Tufts University**, Dept. of Electrical and Computer Engineering, Medford, MA, USA. (June)

## Service and outreach

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### Technical reviewer

- *Certificate of outstanding service as a Reviewer of the IEEE Control Systems Letters, 2018*
- **Journals:** IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems, IEEE Control Systems Letters, IEEE Transactions on Power Systems, IEEE Transactions on Smart Grids, Automatica, Systems & Control Letters, Chaos, IET Control Theory and Applications.
- **Conferences:** IEEE Conference on Decision and Control, American Control Conference, European Control Conference, IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys), IEEE Conference on Control Technology and Applications, IFAC Symposium on Nonlinear Control Systems (NOLCOS).

### Conference session chair or co-chair

- IEEE Conference on Decision and Control, American Control Conference, International Symposium on Mathematical Theory of Networks and Systems.

### Outreach

- Curating KTH's official Instagram account @kthuniversity. *March 2019*
- Forskar Grand Prix, Stockholm, Sweden. Competition in popular scientific presentation of own research for high school students. Won 2<sup>nd</sup> place for presentation "Large-scale collaboration in networks." *September 2017.*

## Publications

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### Theses

1. **E. Tegling:** Fundamental limitations of distributed feedback control in large-scale networks, KTH, Dept. of Automatic Control, Stockholm, December 2018
2. **E. Tegling:** On performance limitations of large-scale networks with distributed feedback control, Licentiate thesis, KTH, Dept. of Automatic Control, Stockholm, May 2016
3. **E. Sjödin:** The price of synchrony: Evaluating transient power losses in renewable energy integrated power networks, M.Sc. Thesis KTH, Dept. of Automatic Control, Stockholm, August 2013, *Awarded best M.Sc. thesis in Electrical, Mechanical or Industrial Engineering at KTH.*
4. **E. Sjödin** and T. Lycken: Wear measurement in knee implants using computed tomography, B.Sc. Thesis, KTH, Dept. of Medical Imaging, Stockholm, June 2011

### Journal articles

1. **E. Tegling** and H. Sandberg: Noise-Induced Limitations to the Scalability of Distributed Integral Control. *Systems & Control Letters*, Vol 130, pp. 23-31, August 2019.
2. **E. Tegling**, P. Mitra, H. Sandberg and B. Bamieh: On fundamental limitations of dynamic feedback control in large-scale networks. *IEEE Transactions on Automatic Control*, 2019 (*to appear*)
3. **E. Tegling**, and H. Sandberg: On the Coherence of Large-Scale Networks with Distributed PI and PD Control. *IEEE Control Systems Letters*, Vol. 1, No. 1, pp.170-175, June 2017.

4. E. Tegling, B. Bamieh and D. F. Gayme: "The Price of Synchrony: Evaluating the Resistive Losses in Synchronizing Power Networks", *IEEE Transactions on Control of Network Systems*, Vol. 2, No. 3, pp.254-266, September 2015

### Conference proceedings (peer reviewed)

1. E. Tegling, R. H. Middleton and M. Seron: Scalability and Fragility in Bounded-Degree Consensus Networks. *8th IFAC Workshop on Distributed Estimation and Control in Networked Systems*, 2019, Chicago, IL, September 2019.
2. E. Tegling, B. Bamieh and H. Sandberg: Localized high-order consensus destabilizes large-scale networks. *2019 American Control Conference (ACC)*, Philadelphia, PA, July 2019.
3. H. Flamme, E. Tegling, and H. Sandberg: Performance Limitations of Distributed Integral Control in Power Networks Under Noisy Measurements. *2018 American Control Conference (ACC)*, Milwaukee, WI, June 2018.
4. M. Andreasson, E. Tegling, H. Sandberg and K. H. Johansson: Coherence in Synchronizing Power Networks with Distributed Integral Control. *56th IEEE Conference on Decision and Control*, Melbourne, VIC, December 2017.
5. M. Andreasson, E. Tegling, H. Sandberg and K. H. Johansson: Performance and scalability of voltage controllers in multi-terminal HVDC networks. *2017 American Control Conference (ACC)*, Seattle, WA, May 2017
6. N. Govindarajan, H. Arbabi, L. van Blargian, T. Matchen, E. Tegling and I. Mezic: An operator-theoretic viewpoint to non-smooth dynamical systems: Koopman analysis of a hybrid pendulum. *55th IEEE Conference on Decision and Control*, Las Vegas, NV, December 2016
7. E. Tegling, M. Andreasson, J. W. Simpson-Porco and H. Sandberg: Improving performance of droop-controlled microgrids through distributed PI-control. *2016 American Control Conference (ACC)*, Boston, MA, July 2016. *Best presentation in session award*.
8. E. Tegling, D. F. Gayme and H. Sandberg: Performance metrics for droop-controlled microgrids with variable voltage dynamics. *54th IEEE Conference on Decision and Control*, Osaka, Japan, December 2015
9. E. Sjödin and D. F. Gayme: Transient losses in synchronizing renewable energy integrated power networks. *2014 American Control Conference (ACC)*, Portland, OR, June 2014
10. E. Sjödin, D. F. Gayme and U. Topcu: Risk mitigated optimal power flow for wind powered grids. *2012 American Control Conference (ACC)*, Montréal, Canada, June 2012

## Skills and competences

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### Languages

- Swedish (native)
- English (fluent)
- German (fluent)
- French (conversational)

### IT and programming

- Matlab, Simulink
- Python, Fortran
- MS Office Suite, QlikView

### Leadership, positions of trust

- Founder and organizer of KTH EE Female Ph.D. Student Network (2015–2017)
- Leadership training at ABB (2012), Ericsson (2014)
- Member of master's program council, KTH (2011–2012)

### Other academic courses attended

- Practical philosophy, Stockholm University, 1 semester (2014–2015)
- Political Science, Stockholm University, ½ semester (2011)
- German, Stockholm University, 1 semester (2008–2009)