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Welcome to Summer School on Robust Model Predictive Control with CasADi

Moritz Diehl, Florian Messerer and Jonathan Frey
University of Freiburg

Sergio Lucia and Moritz Heinlein
Technical University of Dortmund

Joel A.E. Andersson
FMIOPT AS

James B. Rawlings
University of California Santa Barbara
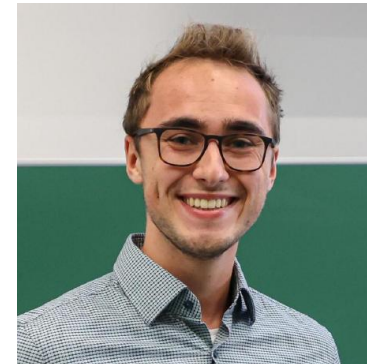
Freiburg, September 15-19, 2025

Teachers

Prof. Dr. James B. Rawlings
Mellichamp Process Control Chair
University of California Santa Barbara

Dr. Joel A.E. Andersson
Founder at FMIOPT AS
CasADi Developer

Prof. Dr. Sergio Lucia and Moritz Heinlein
Technical University of Dortmund

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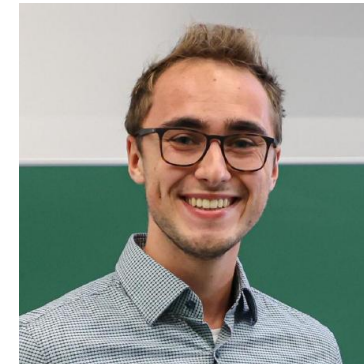University of Freiburg

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Prof. Dr. James B. Rawlings
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University of California Santa Barbara

July 8th, 2025
James B. Rawlings receives nation's highest
honor in control systems engineering

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Technical University of Dortmund

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Richard E. Bellman Control Heritage Award

Recipients [edit]

The following individuals have received the AACC Richard E. Bellman Control Heritage Award:[4]

- 1979: Hendrik Wade Bode
- 1980: Nathaniel B. Nichols
- 1981: Charles Stark Draper
- 1982: Irving Lefkowitz
- 1983: John V. Breakwell
- 1984: Richard E. Bellman
- 1985: Harold Chestnut
- 1986: John Zaborszky
- 1987: John C. Lozier
- 1988: Walter R. Evans
- 1989: Roger W. Brockett
- 1990: Arthur E. Bryson, Jr.
- 1991: John G. Truxal
- 1992: Rutherford Aris
- 1993: Eliahu I. Jury
- 1994: Jose B. Cruz, Jr.
- 1995: Michael Athans
- 1996: Elmer G. Gilbert
- 1997: Rudolf E. Kálmán
- 1998: Lotfi Asker Zadeh
- 1999: Yu-Chi Ho
- 2000: W. Harmon Ray
- 2001: A.V. Balakrishnan
- 2002: Petar V. Kokotovic
- 2003: Kumpati S. Narendra
- 2004: Harold J. Kushner
- 2005: Gene F. Franklin
- 2006: Tamer Başar
- 2007: Sanjoy K. Mitter
- 2008: Pravin Varaiya
- 2009: George Leitmann
- 2010: Dragoslav D. Šiljak
- 2011: Manfred Morari
- 2012: Arthur J. Krener
- 2013: A. Stephen Morse[5][6]
- 2014: Dimitri Bertsekas
- 2015: Thomas F. Edgar
- 2016: Jason L. Speyer
- 2017: John Baras
- 2018: Masayoshi Tomizuka
- 2019: Irena Lasiecka
- 2020: Galip Ulsoy
- 2021: Miroslav Krstić
- 2022: Eduardo Sontag
- 2023: Stephen P. Boyd
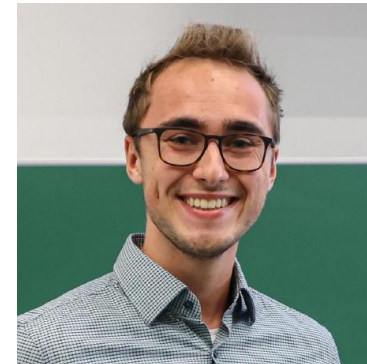- 2024: Naomi Leonard
- 2025: James B. Rawlings

Teachers

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University of California Santa Barbara

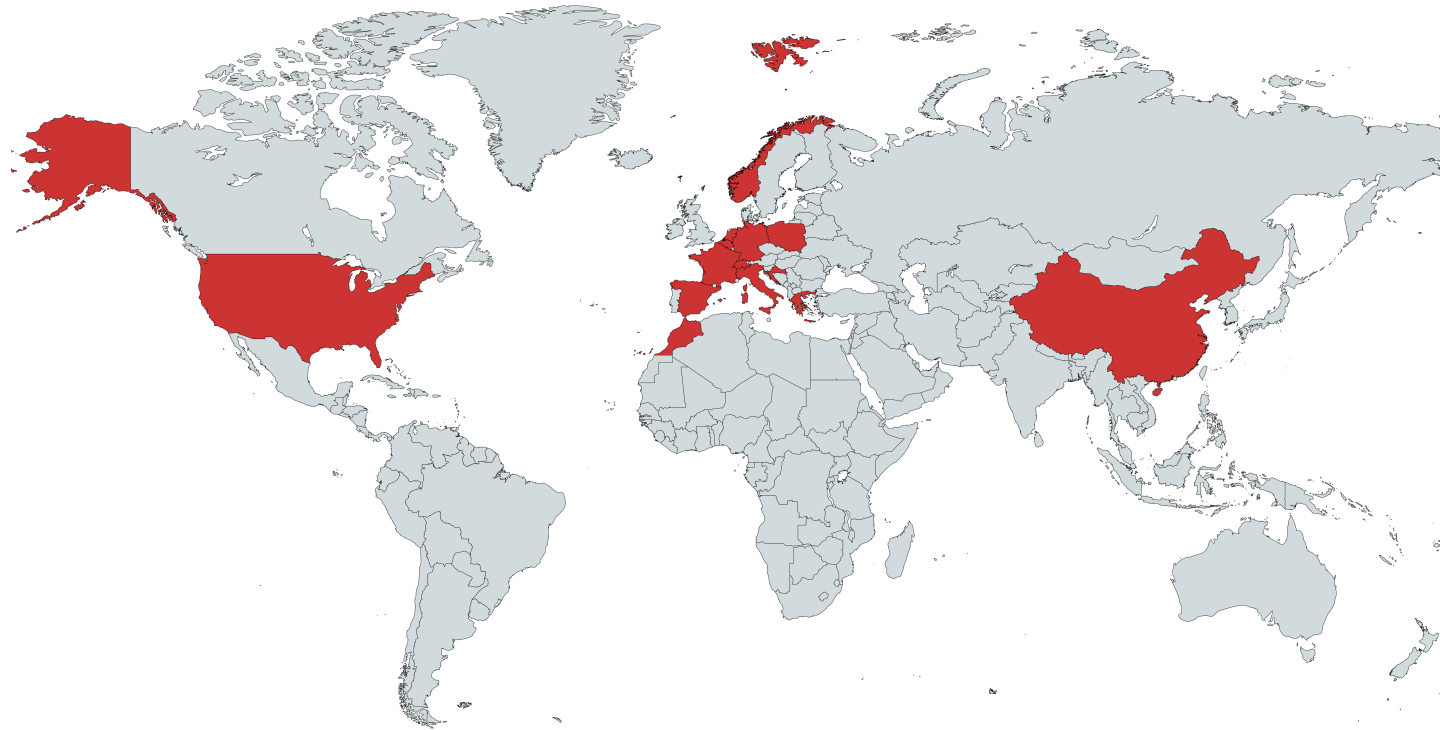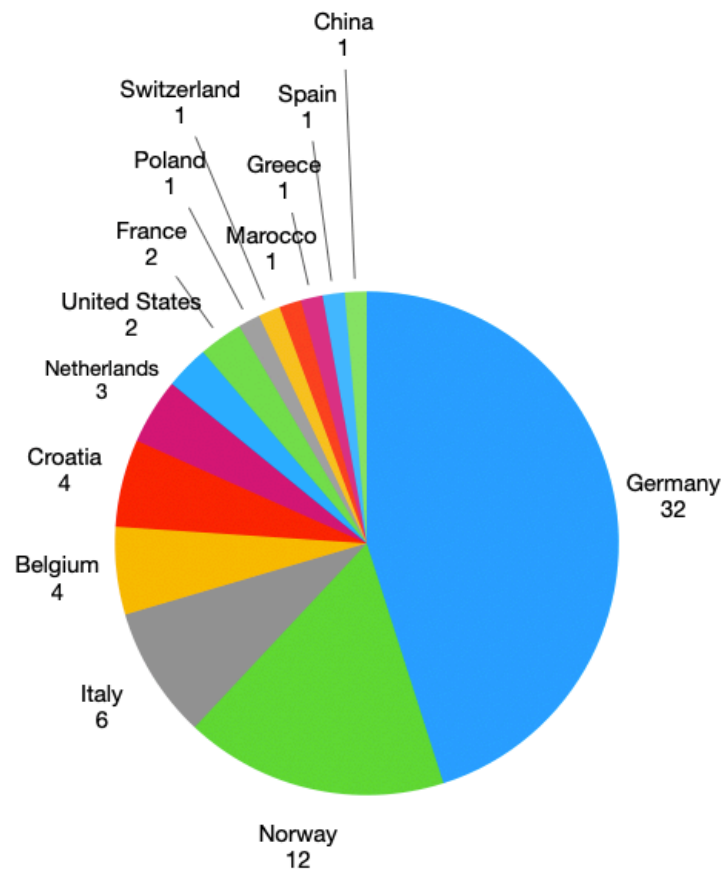Dr. Joel A.E. Andersson
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University of Freiburg

Participants

71 participants from 14 countries
- 59 from universities
- 8 from companies
- 4 from research centres

Schedule

all info on www.syscop.de/events/

	Monday 15.9.	Tuesday 16.9.	Wednesday 17.9.	Thursday 18.9.	Friday 19.9.
08:30-09:00	Arrival & Registration	Arrival	Arrival	Arrival	Arrival
09:00-10:30	**Lecture 1** Nonlinear MPC: Introduction and closed-loop properties *James B. Rawlings*	**Lecture 4** Robust optimization *Moritz Diehl*	**Lecture 7** Minmax robust MPC 1 *James B. Rawlings*	**Lecture 10** Minmax robust MPC 2 *James B. Rawlings*	**Lecture 13** Probabilistic validation *Sergio Lucia*
10:30-11:00	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break
11:00-12:30	**Lecture 2** Numerical optimal control *Moritz Diehl*	**Lecture 5** Multistage robust MPC *Sergio Lucia*	**Lecture 8** Optimization with CasADi and Modelica/FMI models *Joel Andersson*	**Lecture 11** Learning robust NMPC policies *Sergio Lucia*	**Lecture 14** Minmax robust MPC: Recent advances *James B. Rawlings*
12:30-14:00	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break
14:00-15:30	**Lecture 3** Nonlinear MPC: Inherent robustness and discrete actuators *James B. Rawlings*	**Research spotlights** **&** **Introduction to acados** *Jonathan Frey*	**Lecture 9** Robust dynamic optimization *Florian Messerer*	**Lecture 12** Robust MPC exploiting monotonicity *Moritz Heinlein*	**Lecture 15** Towards robust MPC in belief space *Moritz Diehl*
15:30-16:00	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Small farewell reception
16:00-17:30	**Exercise 1** Nonlinear optimization and numerical optimal control with CasADi and IPOPT	**Exercise 2** Numerical optimal control and NMPC with acados	**Exercise 3** Robust dynamic optimization with CasADi and IPOPT	**Exercise 4** Zero order robust NMPC with acados	
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19:00	**Welcome Reception** @ Waldsee		**Dinner** @ Gasthaus Zum Roten Bären		