

MaP Doctoral School strength & durability of materials



1 Strength & Durability of Materials

Understanding and predicting material failure and resistance

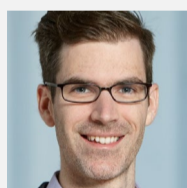
- Sustainability in engineering depends on reducing material use and increasing service life with stronger, tougher, and more durable materials.
- Innovations like meta-materials, self-healing materials, and new manufacturing technologies offer great potential for tailored material properties across various applications.
- Key challenges include predicting material strength, controlling degradation under environmental conditions, and designing optimal micro- and mesostructures for better performance.
- "Strength & Durability" involves multidisciplinary approaches, including predictive modelling, high-performance computing, machine learning, and advanced multiscale material characterisation.

2 Organisation and Focus

Track co-chairs

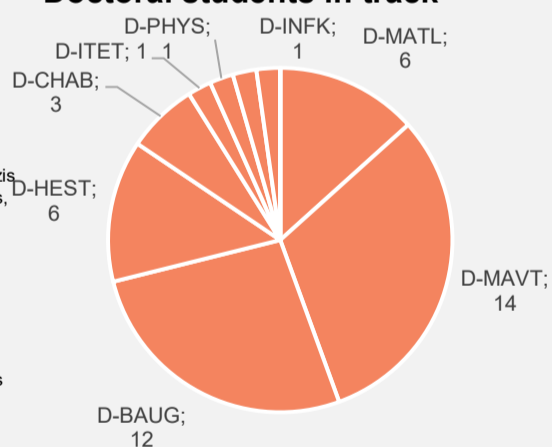


Prof. Dr. Laura De Lorenzis
Computational Mechanics,
D-MAVT



Prof. Dr. David Kammer
Computational Mechanics of
Building Materials,
D-BAUG

Doctoral students in track



Strength & Durability of Materials

THEORY

EXPERIMENTS

SIMULATIONS

DATA

3 Events and Courses

Current and past events

- Material Strength & Durability Symposium
- Corrosion course

→ www.doctoral-school.ethz.ch/events

Number	Title	Type	ECTS	Hours	Lecturers
101-0120-00L	Structural Glass Design and Facade Engineering	W	3 credits	3G	V.-A. Silvestru
101-0127-00L	Advanced Structural Concrete	W	4 credits	2G	L. Gebhard, S. Häflicher
101-0129-00L	Non Destructive Evaluation & Rehabilitation of Existing Structures	W	3 credits	2G	E. Chatzi, B. Herraiz Gómez, G. Kocur
101-0137-00L	Steel Structures III: Advanced Steel and Composite Structures	W	4 credits	2G	A. Taras
101-0159-00L	Method of Finite Elements II	W	3 credits	2G	E. Chatzi, K. Talsis
101-0167-01L	Fibre Composite Materials in Structural Engineering	W	3 credits	2G	M. Motavalli
101-0527-10L	Materials and Constructions	W	4 credits	2G	G. Habert, to be announced
101-0617-01L	Advances in Building Materials	W	4 credits	2G	R. J. Flatt, I. Burgert
101-0617-02L	Computational Science Investigation for Material Mechanics	W	4 credits	2S	D. Kammer, F. Witte
101-0639-01L	Science and Engineering of Glass and Natural Stone in Construction	W	3 credits	2G	
101-0659-01L	Durability and Maintenance of Reinforced Concrete	W	4 credits	2V	U. Angst, Z. Zhang
101-0677-00L	Concrete Technology	W	2 credits	2G	F. Nägele, G. Martinola, T. Wängler
151-0353-00L	Mechanics of Composite Materials	W	4 credits	2V + 1U	G. Pappas

4 Impressions



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