TiRiLab: Ticino Rivers Lab

Opportunities for MSc Project Work in Fall 2018 semester

ETH Zürich, Information for Prospective Students
TiRiLab: what is it?

• river research & education laboratory in environmental engineering at ETH (supported also by Canton Tessin)

• part of EU HyMoCARES AlpineSpace project on the assessment hydromorphology and ecosystem services of European rivers

• platform for MSc students in env. eng. to apply their education in numerical modelling to practical river problems in Tessin

• promotes skills for the job market: independent problem solving, interdisciplinarity, “client interaction” (reporting, presentation)
TiRiLab: why Tessin?

1. Wetlands of national importance: *river ecology*

2. Hydropower regulation: hydro-morphology & sediment transport

3. Flood protection: flood risk
TiRiLab: setup for the student

Fall Semester (Sem 1)
Numerical Hydraulics (Holzner)

Spring Semester (Sem 2)
River Morphodynamic Modelling (Vetsch, Siviglia, Vanzo)

Fall Semester (Sem 3)
Ecohydraulics and Habitat Modelling (Stocker)
Fluvial Systems (Molnar)

Spring Semester (Sem 4)
MSc Thesis in TiRiLab (POSSIBLE ON INDIVIDUAL BASIS)

START: FALL SEMESTER 2018

sign-up with TiRiLab PA (4-6 students)

PROJECT WORK ON TICINO RIVERS (12 ECTS)
> 14 weeks (20 hrs per week)
> extra time paid as HA (+3 hrs per week)

TiRiLab Office Support
IFU: data and logistics
VAW: model support

REPORTING ACTIVITY
> presentation to Canton
> report, data repository

13.04.2018

Peter Molnar
TiRiLab: administration

Directors: Peter Molnar (IFU), Nunzio Siviglia (VAW)

IFU: Maria Magdali, HIL D 21.3, Data and Logistics
> database administration (data collection & organization)
> project administration (scheduling meetings, field trips etc.)

VAW: Francesco Caponi, HIA D 57, Basement Modelling
> data-preprocessing for BASEMENT (e.g. mesh)
> general BASEMENT support

> scientific support with analysis and interpretation
> present at presentations
**TiRiLab: example Maggia River**

Students: Christos Argyrakis, Emmanouil Skourtis, PA 2017

**Topic:** Preliminary hydrodynamic investigation of water and sediment fluxes in the Maggia river

- quantified erosion/deposition from cross-sections
- set-up morphodynamic BASEMENT
- simulated rates of channel change

**Q:** is the river aggrading/degrading during flood periods?
TiRiLab: example Maggia River
TiRiLab: example Ticino River

Student: Donato Patrissi, PA 2017

**Topic:** Hydro-morphological evolution of Tessin River: field data analysis and preliminary numerical investigations

- studied alternate bar evolution along river
- set-up morphodynamic BASEMENT
- simulated rates of sediment transport

**Q:** are conditions good for mobile alternate bar formation?
TiRiLab: example Ticino River

2005

Q=304 m$^3$/s

16/7/2009

Q=551 m$^3$/s

29/3/2012

Q=298 m$^3$/s

13/5/2015

Q=521 m$^3$/s
TiRiLab: example Ticino River

Q = 308 m$^3$/s

Q = 551 m$^3$/s
TiRiLab: examples of potential topics

• flood simulation in rivers (attenuation, inundation, etc.)
• simulation of erosion-deposition patterns
• simulation of aquatic habitat (e.g. fish), PHABSIM approaches
• simulation of downstream sediment transport connectivity
• impact of minimum/alternative flow releases
• assessment of hydropoeaking effects
• assessment of ecological services
• your own input/creativity is welcome

• Target Rivers: Maggia, Brenno, Ticino
  2 students per river
TiRiLab: benefits for student

• student gets exposure to **practical problem solving**
• hands-on practice with **BASEMENT** and **interpretation**

• **extra-work** «scholarship», max (30-35 hrs) x 28.-/hr
• connection to Canton Tessin
• visibility of work on TiRiLab webpage / HyMoCares project
• groupwork experience
**Eligibility:** attendance and good performance in course «River Morphodynamic Modelling»

**Apply**
Deadline: 15.6.2018
To Maria Magdali

**Topic Selection**
by 30.06.2018
Discussion with Peter Molnar Nunzio Siviglia

**Project Work**
Start: 17.09.2018
HiWi work for extra hours

**Submission**
Deadline: 21.12.2018

**TiRiLab Extra**
by 31.03.2018
Make yourself available for providing your PA results for web/presentations/etc.