University of Padua – RIBES 2nd Network School – "Fundamentals of fish fluid mechanics"

The network school will be held over Zoom (link will be sent out later)
The network school (including preparations, readings, and evaluation) corresponds to 4 ECTS.

Date	20 September	21 September	22 September	23 September	24 September
MORNING (9.30 – 12.30 CET)	Welcome (Comoglio & Marion) **School - session 1** Introduction to relevant physical quantities and dimensional analysis (Andrea Marion) Turbulence characteristics in river subdomains (Vladimir Nikora)	**School - session 2** An introduction to fish-flow interactions (Costantino Manes) Field observations of fish-flow interactions (Alex Sukhodolov)	**School – session 3** Introduction to numerical modelling of fish-flow interactions (Andrea Bottacin-Busolin) Artificial replication of flow-fish interactions: how far can we reach? (Jeff Tuthan)	**School – session 4** The role of fish-flow interaction in fish conservation : from theory into practice (Ana Silva) **Complementary activity** Meeting with former MSCA fellows (Loreta Cornacchia and Hamish Biggs) Fish physiology- part 2 Fish breathing (Gianfranco Santovito)	**General RIBES Meeting** **Examination session (if requested by ESRs)**
AFTERNOON (14.30 – 17.00 CET)	**Workshop 1** ERS presentations and discussions (WP1)	**Workshop 2** ERS presentations and discussions (WP2)	**Workshop 3** ERS presentations and discussions (WP3) "wrap up" round with speakers of day #1 and #2	**Workshop 4** ERS presentations and discussions (WP4) "wrap up" round with speakers of day #3 and #4	**Supervisory Board meeting** **Fellow Board Debriefing Meeting**
EVENING (18.00 – 19.00 CET)	**Committee meetings**	**Keynote Lecture** Fish in turbulent flow (Chris Katopodis)	Social evening meeting (ESRs only)	**Fellow Board Meeting**	

Readings:

Hydrodynamics of Aquatic Ecosystems: An interface between ecology, biomechanics and environmental fluid mechanics by Nikora V., *River Research and Applications, Volume 26, Issue 4, Pages 367 – 384, 2010*

Aquatic interfaces: A hydrodynamic and ecological perspective by Marion A. + 16. *Journal of Hydraulic Research, (Open Access) Volume 52, Issue 6, Pages 744 – 758, 2014*

Turbulence in Rivers, by Franca M. J. and Brocchini*Rivers—Physical, Fluvial and Environmental Processes, , Chapter 2, in GeoPlanet: Earth and Planetary Sciences, M. P. Rowiński and A. Radecki-Pawlik (eds.), DOI 10.1007/978-3-319-17719-9_2, Spriger, 2015.*

Effects of fish size, time-to-fatigue and turbulence on swimming performance: a case study of Galaxias maculatus (2003) by V. I. Nikora, J. Aberle, B. J. F. Biggs, I. G. Jowett, J. R. E. Sykes, *Journal of Fish Biology, Vol. 63, Issue 6, 1365-1382*

Response of seaward-migrating european eel (Anguilla anguilla) to manipulated flow fields (2015) by Piper A.T., Manes C., Siniscalchi F., Marion A., Wright R.M., Kemp P.S. *Proceedings of the Royal Society B: Biological Sciences (Open Access) Volume 282, Issue 1811 Article number A01*

What Is the Nature of Multisensory Interaction between Octavolateralis Sub-Systems? By Christopher B. Braun, Sheryl Coombs, Richard R. Fay, *Brain Behavior and Evolution 2002; 59: 162–176*
https://livettu-my.sharepoint.com/:b:/g/personal/jetuht_ttu_ee/EZyEiI35cp5Ok3ffWnJ9N2QB5-mJ1AQE_JxCYz3CXaPHSA?e=Uzb884

For those who may want to focus on the lateral-line organ, we suggest also:
The functioning and significance of the lateral-line organs by S. Dijkgraaf, Biological Reviews (1962), 38, pp. 51-105
https://livettu-my.sharepoint.com/:b:/g/personal/jetuht_ttu_ee/ESC1uNX6kCFNhcUl-4-ZzqIBvzJpLq7MtfkVXQi5cz4bBw?e=7g524q

Video:

In preparation to the complementary activity “Meeting with former MSCA fellows”, RIBES ESRs are invited to watch the documentary “INTERFACES” (https://vimeo.com/196245548), produced as a dissemination product of the former HYTECH ITN Project, also focussed on Ecohydraulics.