

**Third conference of the
International Network for Didactic Research in University Mathematics
September 12-19,2020, Online and virtually from Bizerte (Tunisia)**

<http://indrum2020.sciencesconf.org/>

Fourth announcement

INDRUM 2020 is an ERME Topic Conference: <http://www.mathematik.uni-dortmund.de/~erme/>

In spite of the exceptional situation due to the covid-19 worldwide event, we are pleased to announce that INDRUM2020 will still be held, in the form of an online conference, in the middle of September. The decision to run INDRUM2020 online was not an easy one for the IPC to take as so much effort was invested by the organizing committee in Tunisia in preparing to welcome the delegates in Bizerte. Given uncertainty about travelling however, we see this as a sensible decision. The dates and the timetable have been adjusted to take into consideration, to the best of our knowledge, the other academic duties during this period of the year. In particular, TWG sessions have been reduced in comparison with the initial schedule and the training session for early career researchers has been removed. This has allowed us to fit the conference in eight days with sessions of no more than two hours per day. We hope that you will find it possible to participate and enjoy the scientific programme nonetheless! We also welcome newcomers to the online conference, which will be accessible upon free registration online. We can reveal that the Tunisian committee has a few surprises in store for us, including some Tunisian music to inspire our work. Please, read this document carefully as it includes crucial practical information.

As noted in previous announcements, INDRUM2020 is the third conference of the International Network for Didactic Research in University Mathematics. Initiated by an international team of researchers in didactics of mathematics, INDRUM aims to contribute to the development of research in didactics of mathematics at all levels of tertiary education, with a particular concern for the development of new researchers in the field and for dialogue with mathematicians. The themes to be addressed at INDRUM2020 cover teacher and student practices and the teaching and learning of specific mathematical topics at undergraduate and post-graduate level as well as across disciplines. The target audience of this conference is researchers in didactics of mathematics, mathematicians, as well as teachers and researchers who are interested in these issues. The programme of the conference comprises: a plenary talk by Carl Winsløw (University of Copenhagen, Denmark); an expert panel discussion on higher education in the “digital age”; four thematic working groups; and, short communications in parallel. The main language of the conference is English. There is the possibility to present a paper in French or Arabic as long as the presenter considers how to address the conference audience through slides in English (or both English and one of the other two languages). Pre-conference proceedings are distributed to registered participants through the website. The final version of the proceedings will be posted on the open archive HAL (<https://hal.archives-ouvertes.fr/INDRUM>).

Scientific programme

Plenary talk: Professional and academic bases of university mathematics teaching for the 21st century: the anthropological approach to practice based research - Carl Winsløw (Denmark)

Plenary panel: Higher education in the “digital age” - Panelists: Yael Fleischmann (Norway), Ghislaine Guedet (France), Said Hadjerrouit (Norway) - Chair: Pedro Nicolás (Spain).

Thematic working groups (TWGs)

TWG1: Calculus and Analysis *Chairs:* Laura Branchetti (Italy), Maria Trigueiros (Mexico)

TWG2: Mathematics for engineers, Mathematical Modelling, Mathematics and other disciplines *Chairs:* Berta Barquero (Spain), Nicolas Grenier-Boley (France)

TWG3: Number Theory, Algebra, Discrete Mathematics, Logic *Chairs:* Rolf Biehler (Germany), Viviane Durand-Guerrier (France)

TWG4: Students’ and teachers’ practices. *Chairs:* Irene Biza (United Kingdom), Imène Ghedamsi (Tunisia)

International Programme Committee

Chair: Thomas Hausberger (France); *Co-chair:* Marianna Bosch (Spain)

Members: Faïza Chelloughi (Tunisia), Viviane Durand-Guerrier (France), Imène Ghedamsi (Tunisia), Simon Goodchild (Norway), Reinhard Hochmuth (Germany), Elena Nardi (United Kingdom), Chris Rasmussen (United States of America), Maria Trigueros (Mexico)

Local Organising Committee

Chair: Faïza Chelloughi (Tunisia)

Members: Rahim Kouki (Tunisia), Mahdi Abdeljaouad (Tunisia), Sonia Ben Nejma (Tunisia), Béchir Dali (Tunisia), Viviane Durand-Guerrier (France), Ignasi Florensa (Barcelona, Spain), Imène Ghedamsi (Tunisia), Inès Jendoubi (Tunisia), Fatem Khalloufi (Tunisia), Mahel Mosbah (Tunisia)

INDRUM2020 Updated Timetable

All events will take place online in the form of webinars, using reliable and scalable technical solutions provided by Zoom. Participants will be able to interact with the plenary speaker and with panelists through the chat facility during the plenary zoom webinars. Regular participants registered to INDRUM2020 before it was postponed to September will be able to discuss papers and posters online during the parallel zoom webinars, using audio and video facilities. The choice of TWG must be indicated in the registration form online. Newcomers who have registered on the website (after the postponement and no later than July 31st) will be offered the possibility to attend the parallel webinar of their choice but they will be requested to send questions and comments by chat only. All sessions (plenary and parallel for all the TWGs) will be recorded and made accessible to participants after the session. We expect that this organisation will make it possible for everyone to follow sessions and participate in acceptable conditions, particularly in light of time-zone diversity amongst registered participants.

Saturday September 12th 2020		
15:00 – 15:30	Opening ceremony	Plenary zoom webinar
15:30 – 17:00	Plenary Lecture: Professional and academic bases of university mathematics teaching for the 21st century: the anthropological approach to practice based research C. Winsløw (University of Copenhagen, Denmark)	
Monday September 14th 2020		
15:30 – 17:30	Parallel presentations session 1	Parallel zoom webinars
Tuesday September 15th 2020		
15:30 – 17:00	Thematic Working groups session 1	Parallel zoom webinars
Wednesday September 16th 2020		
15:00 – 17:00	Plenary Panel: Tertiary education in the digital age Y. Fleischmann (Teknisk-Naturvitenskaplige Universitet, Norway) G. Gueudet (Université de Bretagne Occidentale, France) S. Hadjerrouit (Universitetet i Agder, Norway) Chair: P. Nicolas (Universidad de Murcia, Spain)	Plenary zoom webinar
Thursday September 17th 2020		
15:30 – 17:30	Parallel presentations session 2	Parallel zoom webinars
Friday September 18th 2020		
15:30 – 17:30	Thematic Working groups session 2 & short discussion of plenary report	Parallel zoom webinars
Saturday September 19th 2020		
15:00-16:30	Plenary: Thematic working groups reports	Plenary zoom webinar
16:30 -17:00	Closing ceremony	

Note: the indicated times refer to Tunisia (GTM+1)

Plenary Lecture: Professional and academic bases of university mathematics teaching for the 21st century: the anthropological approach to practice based research

Carl Winsløw, University of Copenhagen (Denmark)

INDRUM2020 Keynote Presentation

Abstract: The Didactics of University Mathematics is at the same time similar to, and different from, the Didactics of School Mathematics. The similarity comes from the kinds of phenomena which are studied, from innovative task design, over the descriptive study of teaching episodes and curricula, to institutional conditions and constraints – all pertaining to the teaching and learning of mathematics. Here, the Anthropological Theory of the Didactic (ATD) offers specific tools for a variety of purposes, from the modelling of specific mathematical practices and theories concerned, to the interrelated levels of didactic co-determination ranging from subjects to civilizations. At the same time, Universities offer particular conditions and constraints, such as the co-habitation of scientific research and teaching, and the simultaneous task of teaching mathematics to very diverse populations, including (massively) students for whom mathematics is just a smaller part of their current university curriculum and their future professional aspirations; moreover, the teaching tasks range from filling in gaps in students' pre-university learning of mathematics to the teaching of highly advanced subjects. University mathematics teaching thus represents a profession that involves and requires rather specific and specialized knowledge on the part of the teacher. How are these needs currently attended to? How can the Didactics of University Mathematics interact with the preparation and practice of teachers, given current and future institutional conditions and constraints? In particular, how can teaching and research in University Mathematics interact? In our talk, we will attend to these questions (naturally, pertaining both to the present and the future of the profession) based on ongoing and recent research done within the framework of ATD.

Plenary Panel: Tertiary education in the digital age

Yael Fleischmann (Norwegian University of Science and Technology, Norway),

Ghislaine Gueudet (Université de Brest, France)

Said Hadjerrouit (University of Agder, Norway)

Chair: Pedro Nicolas (Universidad de Murcia, Spain)

Abstract: Due to the whole world of possibilities provided by digital resources, both for teachers and students, many questions arise concerning their use in the teaching of mathematics at tertiary level.

Already the question of what is a digital resource is interesting, as different approaches in didactics may give alternative conceptualisations of this notion, emphasising diverse purposes. One could also wonder about the different uses of digital resources by teachers and students. For instance, in the case of teachers, do they use digital resources to design their course? Does it entail a deep change in the corpus of didactic tools and strategies? In the case of students, do they use digital resources in their studying processes? Does it imply an essentially new bond to the acquisition of knowledge? Of course, the use of digital resources strongly relies on the didactic paradigm (made of teaching ends, teaching means, epistemological model) under which the corresponding study process is taking place. How could the use of digital resources vary in relationship with the different possible didactic paradigms? Regardless this paradigm, what is specific to digital resources and their use at tertiary level?

Perhaps we conclude that digital resources are drastically changing or have already changed education. Or perhaps we conclude quite the opposite. Or maybe everything depends on the assumed didactic paradigm. In any case, it will be interesting to reflect on it.

Practical Information

How to access INDRUM documents

The **session plan** is available on the website in a separate file:

https://indrum2020.sciencesconf.org/data/pages/INDRUM2020_session_plan.pdf

Please, note that this document is a preliminary version that may need to be adjusted to accommodate the agenda of presenting authors (by switching the order of presentations). A final version will be communicated by September 1st.

The **pre-proceedings** may be downloaded from the website using the following link:

https://indrum2020.sciencesconf.org/data/pages/indrum2020_preproceedings.pdf

All these documents, as well as a possibility to browse through all the INDRUM2020 papers and posters (<https://indrum2020.sciencesconf.org/browse/session>), are accessible via the given links or through the left banner on the website. Note: you need to **log in first** with your password in order to access these files.

Registration update and registration of newcomers

Regular participants registered to INDRUM2020 **before it was postponed** to September will be able to discuss papers and posters online during the parallel zoom webinars, using audio and video facilities. The choice of TWG must be indicated in the registration form online. Please, go to “My Space” and then “Registration” on the website to update this form. INDRUM2020 participants are required to choose a TWG and remain in the group for all the discussion sessions, but the recorded files of the sessions of all the TWGs will be made accessible to all registered participants after the sessions.

New participants are welcome. In order to attend the sessions and access the documents, please **register online** and fill in the registration form, including the choice of TWG, **no later than July 31st**. The **registration is free** (with a limit of 400 participants in total). Newcomers will be offered the possibility to attend the parallel webinar of their choice (within a limitation of 100 participants per TWG) but they will be requested to send questions and comments by chat only.

All registered participants will be sent the links to the zoom webinars by email no later than September 10th.

Reimbursement

Due to the exceptional situation created by the Coronavirus pandemic, Tunisian banks have relaxed the reimbursement rules which will be made directly from bank to bank.

Consequently, to obtain reimbursement of the costs paid to the Bizerte Resort hotel for registration and accommodation for the INDRUM 2020 conference, the banks which initiated the money transfer must request from the STB Corniche Bizerte bank*, on behalf of the delegates, the refund of the amount transferred. INDRUM 2020 must be indicated as “subject” in the standard bank to bank form. Please note that this may take some time and that bank charges will not be reimbursed.

*The bank details are indicated on the conference webpage in the “Registration Payment” section (<https://indrum2020.sciencesconf.org/resource/page/id/9>)

Instructions to presenting authors

TWG leaders have been consulted to establish the session plan for each TWG. Should you **need your time-slot to be changed**, please write to the congress chairs to let us know as soon as possible and **no later than July 31st**. Changes in the order of presentations, within the TWG, will then be organised in consultation with TWG leaders.

The time-slot for the presentation of a paper is 20 min and 5 min for a poster. These durations include the time needed to switch between presenters. Zoom provides easy sharing of slides and TWG leaders will assist you to share your presentation in due time. We kindly remind you that slides in English or English and French or Arabic are required, should you decide to give your presentation in French or Arabic.

*We hope that these guidelines are helpful and clear
and we look forward to seeing you all online for an exciting conference!*