Scientific Report BIFD 2022 conference

The Symposium on Bifurcations and Instabilities in Fluid Dynamics (BIFD2022) was held in Groningen on 16-19 August 2022 as an in-person meeting. There were over 70 attendees, all giving an oral or poster presentation. Over 90% of them were from outside The Netherlands and for many of those it was their first face-to-face meeting since the outbreak of the COVID pandemic.

History of the BIFD conferences

Bifurcations and Instabilities in Fluid Dynamics Association (BIFD) was established in 2004 at its 1st meeting at the ICCES Conference in Funchal, Madeira, Portugal. BIFD is a non-profit organization devoted to the promotion of research in instabilities and bifurcations in fluid mechanics, whose main objective is the organization of a bi-annual international scientific conference. The purpose of the meeting is to present and to discuss original theoretical, computational, and experimental research in stability and bifurcation theory related to fluid dynamical phenomena, with emphasis on open questions and benchmark problems, in order to stimulate international scientific cooperation in the field.

Its scope includes the classical hydrodynamic instabilities in shear, rotating, and convective flows (Taylor-Couette, Rayleigh-Bénard, Kelvin-Helmholtz, Bénard-Marangoni, Rayleigh-Taylor, Faraday) and related topics such as flow in thin films, transition to turbulence, magnetohydrodynamics, geophysical and astrophysical fluids, flow control, bio-locomotion.

Previous editions of the BIFD conference were held in:

BIFD 2004 Madeira, Portugal
BIFD 2006 Technical University of Denmark (DTU), Lyngby, Denmark
BIFD 2009 University of Nottingham, United Kingdom
BIFD 2011 Universitat Politècnica de Catalunya, Barcelona, Spain
BIFD 2013 Technion, Haifa, Israel
BIFD 2015 Ecole Supérieure de Physique et de Chimie Industrielles (ESPCI), Paris, France
BIFD 2017 The Woodlands, USA
BIFD 2019 University of Limerick, Limerick, Ireland

The BIFD association has an Advisory Committee consisting of professors Zvi-Pinhas Bar-Yosef (Technion-Israel Institute of Technology), Morten Brøns (Technical University of Denmark), Alexander Gelfgat (Tel Aviv University), and Alex Oron (Technion-Israel Institute of Technology). This committee determines the venues of the Symposia and is involved in the selection of invited speakers and the topics of the contributed presentations.

Presentations by invited speakers

The three invited speakers impressed the audience. Karin Jacobs (Saarland University) shared her insights on instabilities that lead to failures in the adhesion of coatings ranging from paint to implants. She also gave striking examples of how the work of her group helped industry. Andrew Hazel (University of Manchester) introduced us to the world of bubbles where numerical

bifurcation techniques help to organize it. Finally, Henk Dijkstra (Utrecht University) gave a fascinating overview of feedbacks in ocean flows responsible for instabilities.

Contributed presentations

In the table below one can find the subjects of the symposium followed by the number of presentations.

	Subject	*Pres.*
1	Films, drops and liquid bridges	14
2	Magneto-and electrohydrodynamics	7
3	Active fluids: biophysical fluids, reacting flows, crystal growth	2
4	Computational, numerical and analytical methods	9
5	Flows driven by buoyancy, density gradients and/or Marangoni effect: e.g. convection, geophysical flows	13
6	Mechanically-driven flows: shear flows, rotating flows, Taylor-Couette flows, lid-driven cavity flows, Poisseuille, pipe flows	12
7	Bifurcating flows in labs and applications, experimental methods	2
8	Control of instabilities and parametric excitations	8
9	Miscellaneous: Non Newtonian flows, multiphase flows, flows in porous media, microfluidics, multiscale phenomena, compressible flows, transition to turbulence studies, inference of rare events	2

Seven of the presentations in the table were posters that were pitched in a special poster slot. The oral presentations were scheduled in slots of 20 minutes.

Social programme

The social programme consisted of the following events:

- A welcoming reception at the *Prinsenhof* in Groningen (the majority of participants stayed until the end of the evening (22.00h) which is an indication of the good atmosphere);
- A city walk organized by the *Groninger Gidsen Team* during which participants were given a tour along locations in the city of Groningen that have a particular historical significance;
- A conference dinner at restaurant *'t Feithuis*.

Moreover, the venue of the conference was in the center of the city. This all added to a very good atmosphere during the conference and many interactions between participants. These interactions could not have been reached by an online conference. And after all, we are happy that we delayed the conference by one year to make this possible.

Initiation of collaborations

As organizers we made the deliberate decision to have long coffee breaks (40 minutes) and long lunch breaks (100 minutes). The Wednesday afternoon was deliberately scheduled as free time. This created ample time for discussion and participants made use of that considering the pen and paper interactions that took place. Also invitations happened and new collaborations initiated. Participants also indicated that they appreciated this setup because it gave them the opportunity to speak to colleagues again after a period of nearly two years during which interactions could only be made online.

Next edition

During the meeting, the organizers of the next meeting presented their city. In 2024, the conference will be held in Edinburgh, Scotland.