Mixing in Porous Media

February 3 – 7, 2020 Lorentz Center@Oort

Scientific

Description and aims

Mixing in porous and fractured media is key to a diversity of systems in biology, engineering and geology and span a wide range of spatio-temporal scales. Thus a deeper understanding of the mechanisms of mixing in porous media – including flow, transport, chemical reactions and biological activity – is essential for myriad applications. Insights into these mechanisms remain limited yet novel theoretical, numerical and experimental approaches in disciplines beyond those traditionally associated with transport in porous media have recently emerged that facilitate much deeper understanding. The aim of the workshop was bringing together scientists from relevant disciplines so as to (i) identify key challenges regarding mixing in porous media, (ii) develop strategies to address these challenges and (iii) develop strategies to strengthen and build a multi-disciplinary research community.

Tangible outcome

The following initiatives are taken so as to achieve a long-term impact beyond the workshop itself:

- A special issue on the workshop themes (with the workshop organizers as guest editors) in the Springer journal *Transport in Porous Media* (TIPM) with contributions by participants. TIPM features special issues on a regular basis and is an ideal "mouthpiece" into the porous-media community. The editor-in-chief, prof. Martin Blunt, supports this initiative. A call for contributions will be announced soon.

- Creation of a focus group "Mixing in Porous Media" in the International Society for Porous Media *Interpore* so as to structurally build a community for this topic. To this end the summaries of the "community-building sessions" (see workshop format below) are currently being combined into a "white paper" for the focus group by the discussion leaders and workshop organizers. Prof. Majid Hassanizadeh, managing director of Interpore (and one of the keynote speakers), supports this initiative.

- Creation of a dedicated website on the topic "Mixing in Porous Media" consisting of a theme-wise collection of the material presented at the workshop. To this end the presentation slides and posters are currently being collected by the organizers. This website will be made accessible to both the workshop participants and anyone else interested in the subject matter so as to maximise the outreach.

The organizers are, based on the lively discussions and significant audience participation during the workshop, confident that these initiatives will attract active contributions by many of the workshop participants.

Scientific breakthrough

The main goal of the workshop was contributing to the resolution of key challenges by bringing together researchers from different fields and foster multi-disciplinary collaborations. The workshop resulted in considerable exchange and interaction between participants from a wide range of backgrounds and thus achieved a (scientific) breakthrough in the sense of establishing new links between scientific communities and initiating post-workshop efforts as those mentioned above. This lays the foundation for scientific progress and breakthroughs on the key workshop themes.

Organization – Format of the workshop

The workshop was organized around a series of oral presentations punctuated by both informal and moderated discussions. Keynote lectures gave an overview of the state-of-the-art of the field and discuss open challenges. Invited and contributed talks as well as a poster exhibition for the duration of the workshop focused on current developments related with the workshop themes. Three so-called "community-building sessions", each moderated by 2 discussion leaders, were included to find common ground between participants for (cross-disciplinary) collaboration and concerted research efforts that address major challenges.

Marco Dentz (Barcelona, Spain)
Daniel Lester (Melbourne, Australia)
Michel Speetjens (Eindhoven, The Netherlands)