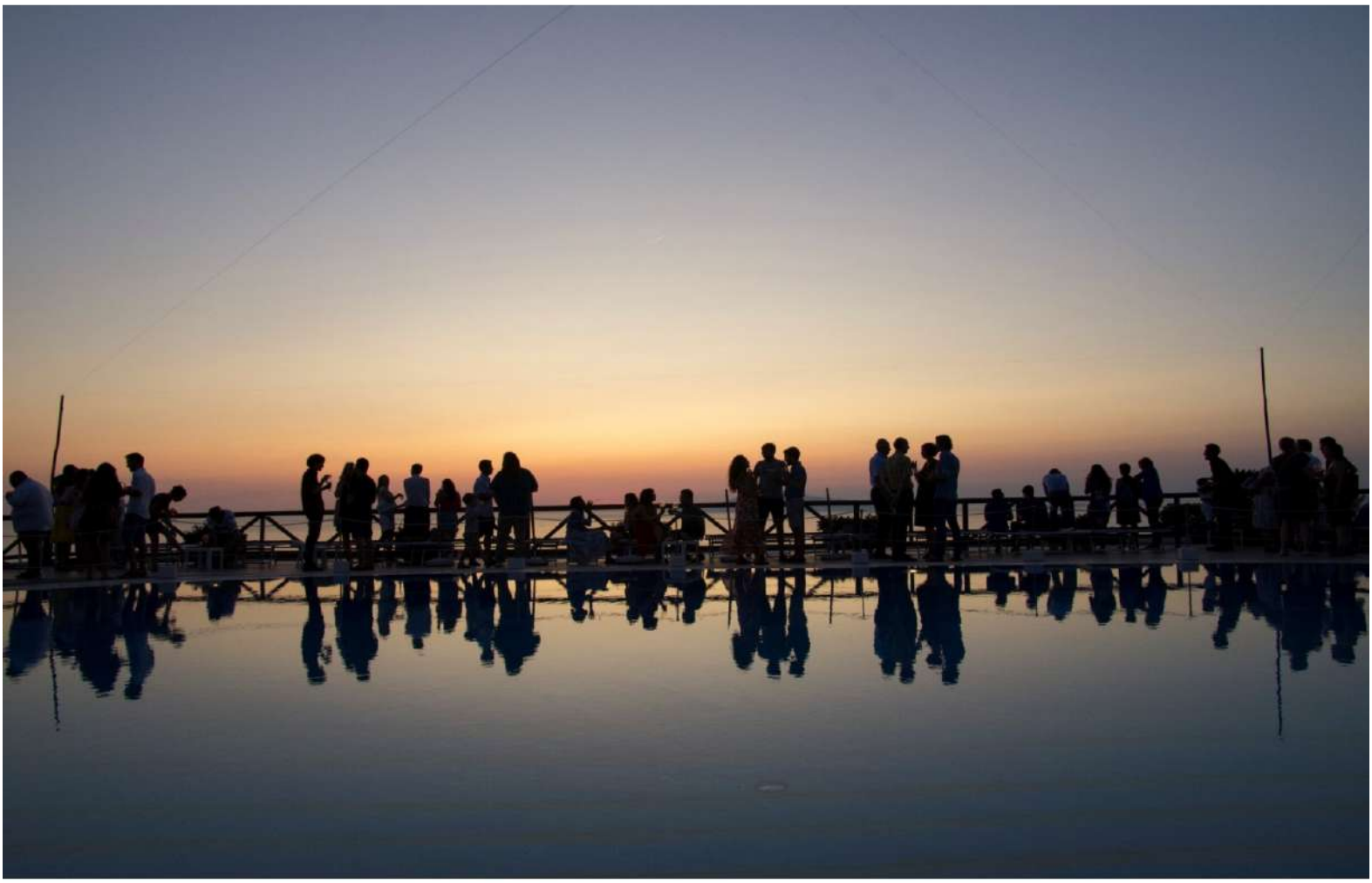
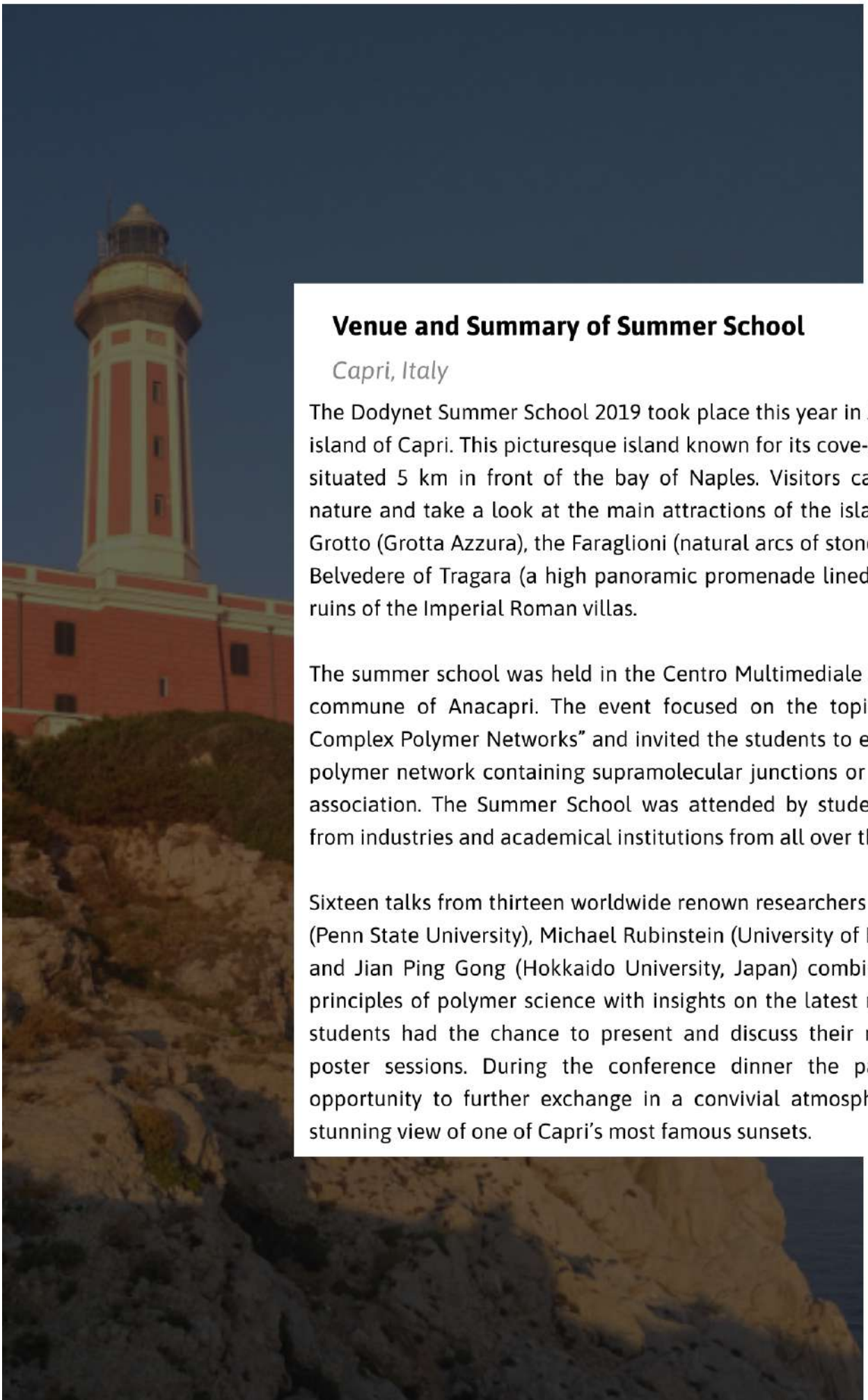


Newsletter Summer School Capri July 2019

INITIAL TRAINING NETWORK

01.



Venue and Summary of Summer School

Capri, Italy

The Dodynet Summer School 2019 took place this year in July on the beautiful island of Capri. This picturesque island known for its cove-studded coast-line is situated 5 km in front of the bay of Naples. Visitors can enjoy the unique nature and take a look at the main attractions of the island such as the Blue Grotto (Grotta Azzura), the Faraglioni (natural arcs of stone above the sea), the Belvedere of Tragara (a high panoramic promenade lined with villas) and the ruins of the Imperial Roman villas.

The summer school was held in the Centro Multimediale Mario Cacace in the commune of Anacapri. The event focused on the topic of "Transient and Complex Polymer Networks" and invited the students to explore all aspects of polymer network containing supramolecular junctions or several dynamics of association. The Summer School was attended by students and researchers from industries and academical institutions from all over the world.

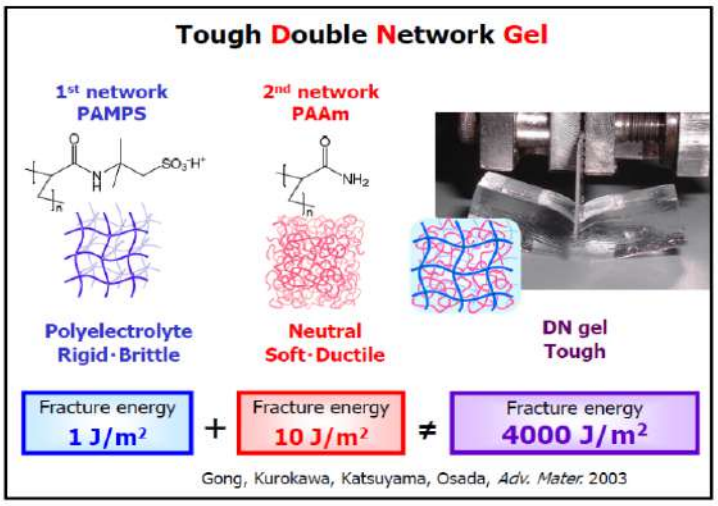
Sixteen talks from thirteen worldwide renown researchers such as Ralph Colby (Penn State University), Michael Rubinstein (University of North Carolina, USA) and Jian Ping Gong (Hokkaido University, Japan) combined the teaching of principles of polymer science with insights on the latest research results. The students had the chance to present and discuss their research during two poster sessions. During the conference dinner the participants had the opportunity to further exchange in a convivial atmosphere while having a stunning view of one of Capri's most famous sunsets.

Focus on Professor Gong Hokkaido University, Japan

One of the most anticipated talks was given by **Jian Ping Gong**. She is a distinguished professor at the Hokkaido University, Sapporo, where she focuses her research on the study of physical and biological properties of soft and wet matters. Recently, she got a lot of attention from the scientific community for her research on double network hydrogels that show outstanding mechanical properties.

In her talk "*Design and Development of Tough and Self-Growing Hydrogels*" Prof. Gong gave an introduction on double network hydrogels. Hydrogels represent a class of materials that consists out of polymer networks that are swollen by water. These kinds of material represent the ideal candidates to be used as soft tissue-like biomaterials in advanced medical technology. However, common hydrogels have poor mechanical properties and are thus too weak to be used as structure materials.

Gong and her group investigated the structural causes for the hydrogel fragility and explored strategies to improve their mechanical performance. Gong and her co-workers found out that a tough hydrogel can be achieved by combining two subnetworks with contrasting structures. One of these subnetworks is ductile and expandable, the other one is brittle and hence provides sacrificial bonds that can dissipate energy at rupture. In consequence, the resistance to crack propagation improves and the double hydrogel shows a significant higher toughness than the two individual networks would show combined.



03.

Toughts on lectures

One of the aspects I liked the most about DoDyNet is that we have the luck to get to know experts and get inspired by their work!

I really enjoyed the lecture of Ilja Voets about nanoscopy for nanomaterials. She explained to us how we can obtain images with high resolution through the single molecule localization microscopy. It makes me want to do some experiments with this technique as well!

The most amazing part of the Summer School was the very well-known professors' lectures. It broadened our views. Prof. Yuichi Masubuchi and Prof. Zuowei Wang's lectures impressed me the most because we have the same topic of research – simulation - and their lectures gave me some inspiration, which is useful for my own work.

I loved the lecture of Marrucci. It was really a lecture in which he described easily and clearly (for everyone!) different polymer networks and their properties.

The lectures that inspired me the most were given by Gong and Voets.
It was great that the summer school also covered aspects of applied research.

It was interesting to see industrial cases of (ir)reversible polymer networks with Salvatore Coppola.

I found fascinating the presentations of Prof. Colby and Dr. Filippidi.
The former gave me a new approach on understanding experimental data while the latter inspired possible measurement techniques for probing DDNs.

04.

Toughts on lectures

All the lectures are wonderful in different topics, and the lectures of Prof. Michael Rubinstein and prof. Daniel Read were given with lots of passion.

Prof. Jian Ping Gong lecture showed us the strategy of molecular design of self-growing hydrogels from the basic idea, it is a powerful work.

Since Prof. Hiroshi Watanabe, Prof. Bradly Olsen, Prof. Ralph Colby and Prof. Emmanouela Filippidi lectures focused on supramolecular network, which is closer to my current work. I got some ideas in chemistry and characterization techniques.

In addition, through Prof. Zuowei Wang lecture, which helped me to further understand the exchange mechanism in the polymer network based on simulation.

05.

Along with other students from different universities, the students from DoDyNet had the opportunity to present a poster allowing discussion with the experts and the other PhD students.

Carillo Consiglia (FORTH, Heraklion): Effects of crosslinking on the linear viscoelastic response of industrial networks
Co-authors: Stephan Zoellner, Dimitris Vlassopoulos

Charles Carole-Ann (CNRS Montpellier): Elastocapillary effects in transient networks
Co-authors: Laurence Ramos and Christian Ligoure, Laboratoire Charles Coulomb

Coutouly Clément (UCLouvain): Synthesis and dynamics of model supramolecular polymer networks
Co-authors: Charles-André Fustin, Evelyne van Ruymbeke

Hammer Larissa (ESPCI, Paris): Design and Characterization of Double Dynamic Chemical Networks
Co-author: Renaud Nicolaÿ

Ju Jianzhu (ESPCI, Paris): Detection of Fracture Precursor in Polymer Networks by Space-Resolved Multi-Speckle Diffusing Wave Spectroscopy
Co-authors: Luca Cipelletti, Tetsuharu Narita and Costantino Creton

Li Yanzhao (UCLouvain): Controlling the Dynamics of Metallo-Supramolecular Polymer with Two Metal-Ligand Crosslinks

06.

Liu Hongwei (UNaples): Modeling the Sticky Rouse Model with Periodic Boundary Conditions
Co-author: Giovanni Ianniruberto

Lyons Rowanne (UCLouvain): Synthesis and dynamics of slide-ring materials for double networks
Co-authors : Evelyne van Ruymbeke, Charles-André Fustin

Nicolella Paola (UMainz): Design of a double dynamic model network with terpyridine complex and thermoresponsive polymer crosslinking motifs
Co-author: Sebastian Seiffert

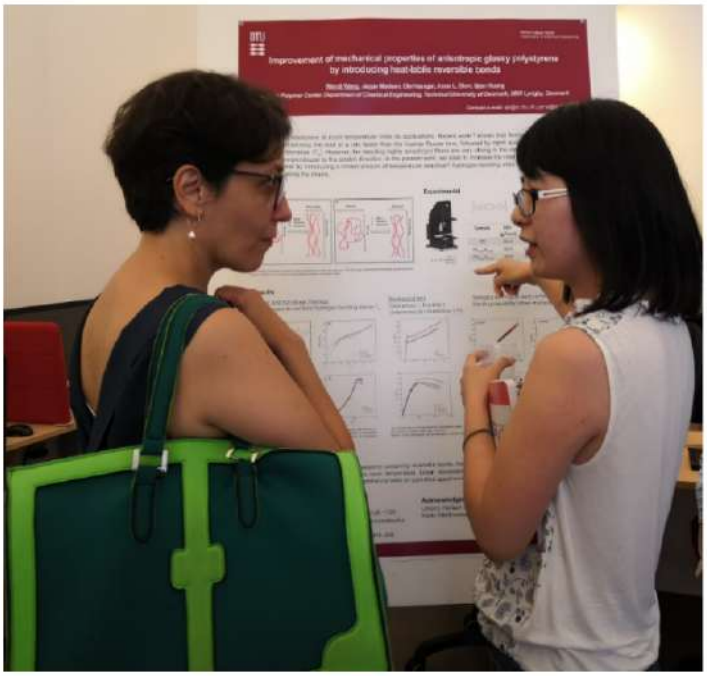
Sbrescia Simone (DSM-UCLouvain): Understanding temperature and time dependence of mechanical properties of thermoplastic elastomers
Co-authors: Tom Engels, Michelle Seitz, Evelyne Van Ruymbeke

Pyromali Christina (FORTH, Heraklion): Linear and Nonlinear Viscoelastic Response of Metallo-Supramolecular Polymeric Networks
Co-authors: Flanco Zhuge, Charles-André Fustin, Evelyne van Ruymbeke and Dimitris Vlassopoulos

Wang Wendi (DTU, Denmark): Rheological and mechanical properties of polystyrene with hydrogen bonding
Co-authors: Jeppe Madsen, Anne L. Skov, Ole Hassager, Qian Huang

07.

Here are some thoughts about the Poster session which was really useful to all of us!



I learned two things from the poster session. Firstly, it was a good chance to show my work, how to introduce it in very short time to other researchers who may not know much about this specific area. Secondly, I learned on other researchers' works and it provided a good chance to seek cooperation.

I mostly liked the open scientific discussions and the poster sessions where we had the chance to present our work, get feedback, new ideas and suggestions.

It was a great chance to show our research to all the participants and discuss freely from peer to peer.

During the poster session, I had some opinions and suggestions about the interpretation of my results and the measurements that could be interesting to perform also in other universities.

08.

The voice of the students on the Summer School

Everything was perfect!
The organization (thanks Prof. Ianniruberto!), the invited speakers, the opportunity given with the poster session, the feedback from the experts...
The wonderful location and the good food have made science even more enjoyable.

It is a good training to present my own work to the professors and other PhD students.
I got some suggestions and learned from other PhD students, most important, different professors told me how to make a comprehensive thinking and analysis of my questions.

I really liked the opportunity to talk with the experts during the whole week!

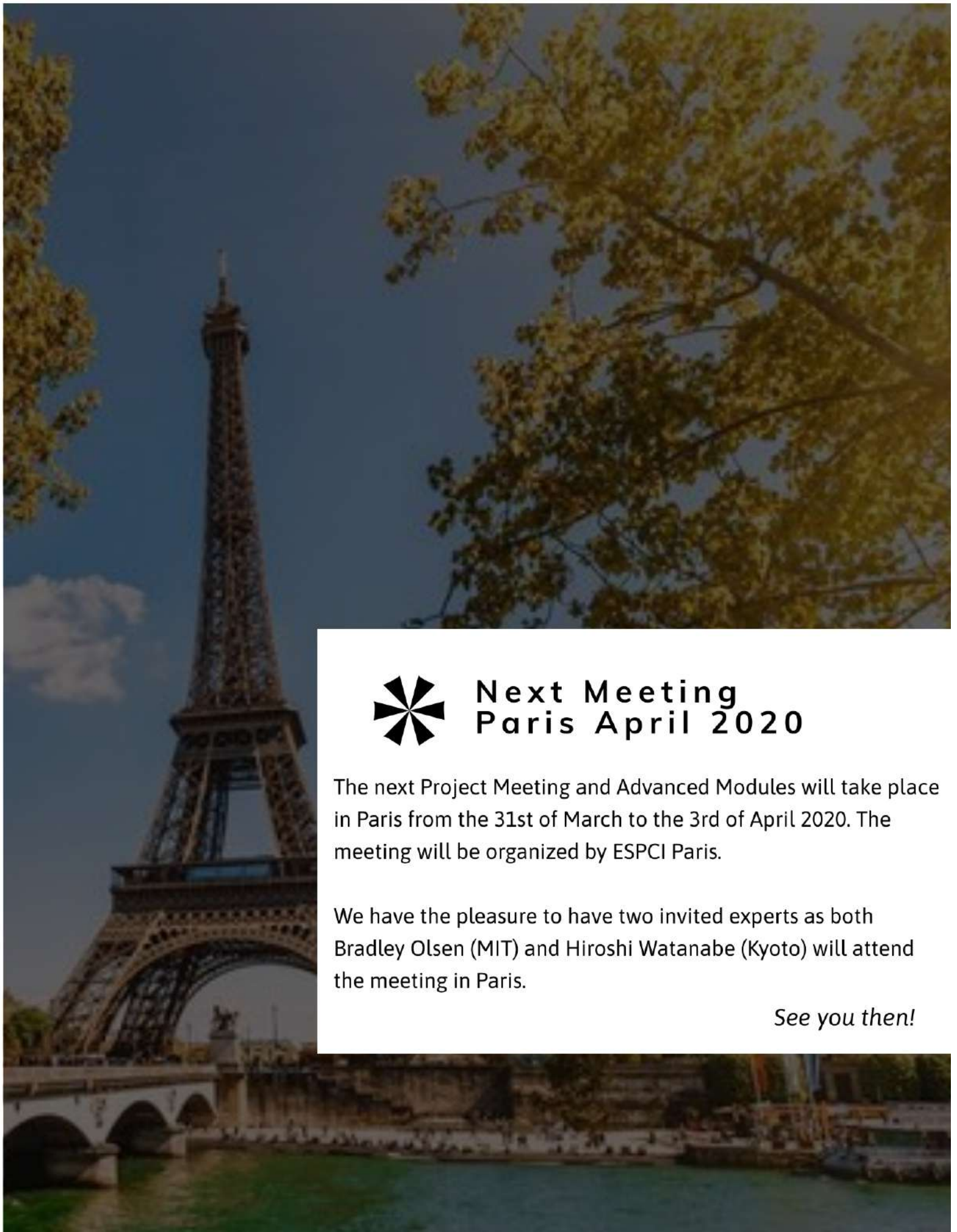
09.

It was a great experience to attend the DoDynet Summer School and Workshop in Capri, a really small but fascinating island. I met a lot of enthusiastic Italian people, and best researchers in polymer rheology domain, as well as tasting Italian food, which all enrich my experience. I was most impressed by the professors' lectures, in particular the way in which they present their work.

The time spent in Capri was really nice and useful, not only for the possibility to learn more with the lectures but also for the opportunity to meet the main experts in the field and other students and easily discuss with them..

I especially appreciated the unique location of the Summer School.
It was an amazing experience to stay one unforgettable week in Capri.

10.



Next Meeting Paris April 2020

The next Project Meeting and Advanced Modules will take place in Paris from the 31st of March to the 3rd of April 2020. The meeting will be organized by ESPCI Paris.

We have the pleasure to have two invited experts as both Bradley Olsen (MIT) and Hiroshi Watanabe (Kyoto) will attend the meeting in Paris.

See you then!

11.

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