ProgMatCon 2020

INTERNATIONAL CONFERENCE ON PROGRAMMABLE MATERIALS

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International conference on programmable materials – Fostering the paradigm shift in materials research

Programmable materials have the potential to initiate a paradigm shift since they can perform system functions through their internal design. This allows for increased functional integration while simultaneously reducing system complexity.

The inner structure of programmable materials is designed and manufactured in such a way that properties and behavior can be controlled and reversibly changed. Furthermore, locally varying functions can be programmed into such materials

The application potential for programmable materials is immense: programmable pore sizes enable self-cleaning membrane filters for water treatment systems, materials with programmable heat transfer ensure energy-efficient heat management in machines or buildings, shape morphing materials can change aerodynamics and programmable friction can be used to intelligently control coupling and positioning systems.

The first international conference on programmable materials brings together scientists critical to the success of programmable materials from the disciplines of materials science, mechanics, optimization, process technology and product development and ensures their productive interaction via suitable formats, which is analogous to the integral approach inherent in programmable materials.

The conference is aimed at scientists and engineers who want to advance programmable materials with multidisciplinary contributions, who want to work on powerful tools for their realization, and who want to contribute to the paradigm shift in materials development.

Thematic priorities can be: the simulation of programmed materials, the optimization and programming of material functions, the development of suitable process technology for modular or hybrid production of programmable materials or the validation of programmable materials by demonstrators and prototypes.

Organised by Fraunhofer cluster of excellence programmable materials CPM

Conference chairs

Prof. Peter Gumbsch, Fraunhofer IWM, Freiburg
Prof. Alexander Böker, Fraunhofer IAP, Postdam
Prof. Chris Eberl, Fraunhofer IWM, Freiburg

Abstract submission and registration

www.progmatcon.com

Venue

H4 Hotel Berlin Alexanderplatz
Karl-Liebknecht-Straße 32
10178 Berlin, Germany
www.h-hotels.com/de/h4/hotels/h4-hotel-berlin-alexanderplatz

Conference fees

	Early Bird (until 14 Feb. 2020)	Late (until 20 March 2020)
Regular	480 €	550 €
Student	220 €	290 €

Contact

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Important dates

Abstract submission start: 15 October 2019
Abstract submission deadline: 20 January 2020
Notification of Acceptance: 10 February 2020
Oral program release (1st Ed): 14 February 2020
Early bird registration deadline: 14 February 2020
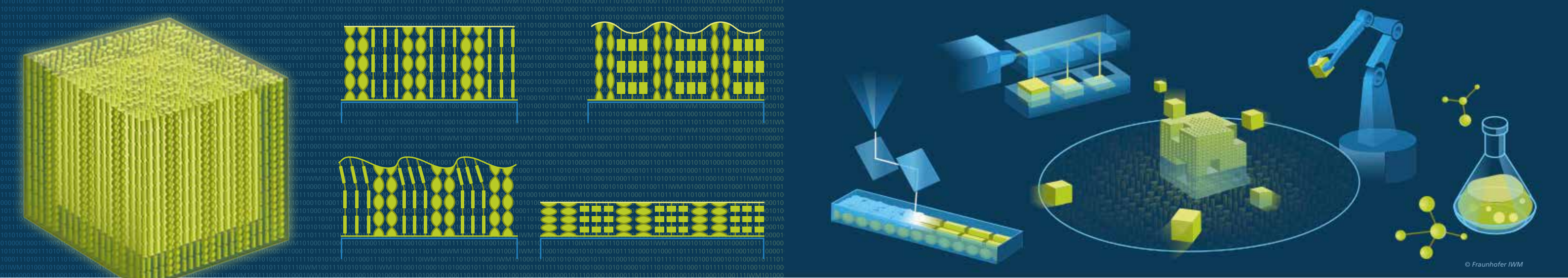Registration deadline: 20 March 2020

www.progmatcon.com
www.cpm.fraunhofer.de

INTERNATIONAL CONFERENCE ON PROGRAMMABLE MATERIALS

27 - 29 April 2020, Berlin

Fostering the Paradigm Shift in Materials Research

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International conference on programmable materials

Status 2019-12-10

Plenary speakers
– Martin van Hecke, AMOLF Amsterdam, Netherlands
– Cecilia Laschi, School of Advanced Studies Pisa, Italy
– Jean-Francois Lutz, ICS Straßbourg, France
– Mark Miodownik, University College London, UK
– Ole Sigmund, DTU, Denmark

Symposia

Optimal design of mechanical metamaterials and bionic structures

Organizers:
– Heiko Andrä, Fraunhofer ITWM, Kaiserslautern, Germany
– Matthew Begley, University of California, Santa Barbara, USA
– Ralf Müller, Technical University, Kaiserslautern, Germany

Simulation and optimization methods for synthetic porous and composite materials which exhibit unusual mechanical properties.

Invited speakers:
– Matthew Begley, University of California, Santa Barbara, USA
– Dennis Kochmann, ETH Zürich, Switzerland

Programmable surface interactions and friction

Organizers:
– Tobias Amann, Fraunhofer IWM, Freiburg, Germany
– Sergej Glavatskih, Royal Institute of Technology, Stockholm, Sweden
– Andreas Kailer, Fraunhofer IWM, Freiburg, Germany
– Ian Sherrington, University of Central Lancashire, UK

Programming coefficients of friction into technical applications in order to stabilize a best possible operating point dynamically depending on the prevailing load collective.

Invited speakers:
– Jaqueline Krim, North Carolina State University, Raleigh, USA
– Mark W. Rutland, KTH Royal Institute of Technology, Sweden

Shape memory polymers

Organizers:
– Thorsten Pretsch, Fraunhofer IAP, Potsdam, Germany
– Jean-Marie Raquez, University of Mons, Mons, Belgium

Recent progress in synthesis, processing and additive manufacturing of shape memory polymers and the development of programming routes for one-way and in particular for two-way shape memory effects.

Invited speakers:
– Weimin Huang, Nanyang Technological University, Jurong West, Singapore
– Tao Xie, Zhejiang University, Hangzhou, China
– Julian Zhu, Université de Montréal, Canada

Design ideas from nature

Organizers:
– Alexander Böker, Fraunhofer IAP, Potsdam-Golm, Germany
– Peter Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam-Golm, Germany

Focus on various design principles from nature, inspiring the integration of sensoring and actuating functionalities into modern artificial materials.

Invited speakers:
– Stephen Mann, University of Bristol, UK
– Christiane Sauer, Weissensee University of Fine Arts, Berlin, Germany
– Thomas Speck, Albert Ludwigs University, Freiburg, Germany

Mechanical metamaterials

Organizers:
– Brad Boyce, Los Alamos National Laboratory, USA
– Chris Eberl, Fraunhofer IWM, Freiburg, Germany

Designing adaptive shape morphing or surface properties requires us to understand, predict and optimize the complex mechanical interaction within programmable materials.

Invited speakers:
– Bas Overwelde, AMOLF, Amsterdam, Netherlands

Programmable syntheses

Organizers:
– Alexander Böker, Fraunhofer IAP, Potsdam-Golm, Germany
– Filip Du Prez, Ghent University, Belgium
– Stefan Reinicke, Fraunhofer IAP, Potsdam-Golm, Germany

Materials with programmed specific information, functions and/or complex structure formation patterns; synthetic protocols and design principles; applications.

Invited speakers:
– Laura Hartmann, Heinrich-Heine-University, Düsseldorf, Germany
– Caroline Ross (MIT) or Paul Nealey (Chicago) or Uli Wiesner (Cornell University)
– Andreas Walther, Albert Ludwigs University Freiburg, Germany

Manufacturing and upscaling

Organizers:
– Bernd Bader, Fraunhofer ICT, Pfinztal, Germany
– André Bucht, Fraunhofer IWU, Dresden, Germany
– Kevin Moser, Fraunhofer ICT, Pfinztal, Germany

The complexity of programmable materials (PM) exhibiting properties like predefined shape or stiffness changes requires new production processes in order to create an economic benefit.

Invited speakers:
– Carolin Körner, Friedrich Alexander University Erlangen-Nürnberg, Erlangen, Germany
– Markus Milwich, German Institutes of Textile and Fiber Research Denkendorf, Germany

Applications and design with programmable materials

Organizers:
– Fridjof Meinel, University of Art and Design Halle, Germany
– Sylvia Schattauer, Fraunhofer Gesellschaft, München, Germany
– Linda Weisheit, Fraunhofer IWU, Chemnitz, Germany

Product ideas and visions, i.a. soft robotics and morphing structures, using programmable materials or structure integrated functionalities, tools and methods for developing such.

Invited speakers:
– Paul-Rouven Denz, Priedemann Facade-Lab GmbH, Berlin, Germany