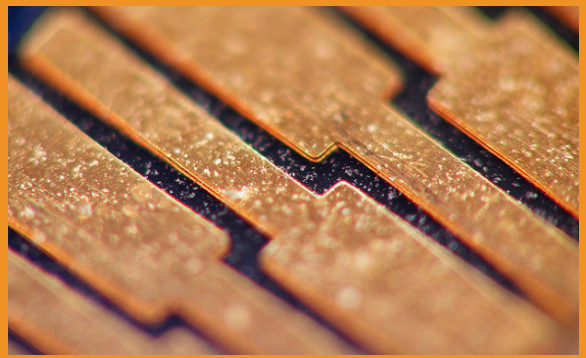
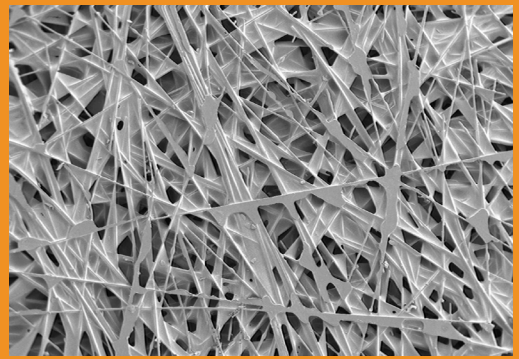
4TU.HTM

Welcome to the 4th 4TU.HTM symposium

Dutch Materials

October 12, 2018





TU Delft Delft University of Technology

TU/e Technische Universiteit Eindhoven University of Technology

UNIVERSITY OF TWENTE.

WAGENINGEN UR For quality of life

4TU.HTM

4TU Research Centre High-Tech Materials (4TU.HTM)

aims to

- strengthen collaboration between the four TU's
- strengthen the research field Materials Science and Engineering
- stimulate education in Materials Science and Engineering

http://www.4TU.nl/HTM

4TU.HTM

- Officially established November 10, 2014
- Research programme *New Horizons for Designer Materials*, 2016 – 2019
- 4TU.HTM will continue its activities in 2019 – 2021
- k€ 150 per year for organisation and activities

http://www.4TU.nl/HTM

Activities 4TU.HTM

- Research programme *New horizons for designer materials*
- Yearly symposium Dutch Materials
- Support & organise joint Materials Science workshops
- Improve accessibility Materials Science and Engineering
- Stimulate Summer Schools and Graduate Courses
- Finance collaborative projects
- Develop activities to attract students
- Website www.4TU.nl/HTM

Research programme *New horizons for designer materials*

- *Understanding structure formation in hierarchical hybrid materials through in situ liquid phase microscopies*, Joe Patterson, Mohammad Moradi (TU/e)
- *"From Flatland to Spaceland": towards advanced, 3-dimensional materials bottom-up, from polymer decorated nano- and microstructures*, Maciek Kopec (UT, TU/e)
- *Reversible crosslinking: a potent paradigm for designer materials*, Nick Tito (TU/e)
- *Metamaterials with tunable dynamical properties*, Priscilla Brandão Silva (TU/e)
- *Superconducting carbon nanotubes composite as vertical interconnect for qubit integration at cryogenic* temperature, René Poelma, Amir Mirzagheytaghi (TUD)
- *Communicating surfaces*, Danqing Liu, Wanshu Zhang (TU/e)

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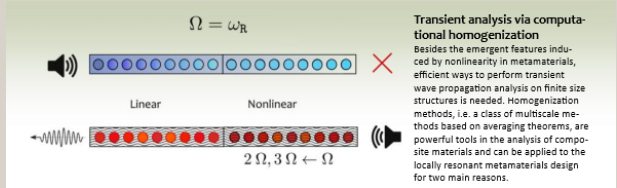
Research programme *New horizons for designer materials*

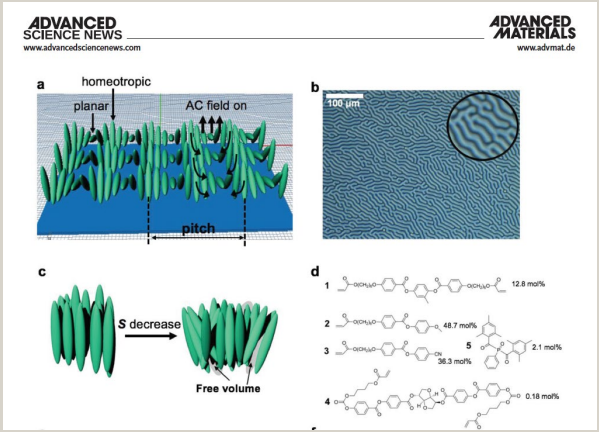
The programme will end in 2019; for the coming time no new 4TU research programme in materials.

Collaboration and visits of international experts.

Personal grants for Joe Patterson and Danqing Liu.

Scientific publications, articles in *Innovative Materials* (English and Dutch).





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2019 – 2021

Geachte heer Sietsma,

Op 29 augustus 2018 is in 4TU.Onderzoek gesproken over de voorzetting van de activiteiten van 4TU.High Tech Materials. In de plannen voor de toekomst geeft u prioriteit aan een bredere en structurele opleiding van promovendi, de bevordering van de relatie met de industrie door een strategisch partnership met M2i, de vergroting van de zichtbaarheid en toegankelijkheid van experts en faciliteiten en de "Joint Materials Science Activities", waaronder een jaarlijkse conferentie.

De plannen zijn aanleiding om 4TU.HTM voor een periode van drie jaar (2019-2021) een budget toe te kennen van k€ 150 per jaar uit de middelen van 4TU voor het continueren van uw netwerkorganisatie. Het budget voor 2019 komt in de plaats van de eerder (brief 4TU-UIT-290/1) toegekende k€50 voor 2019.

- relation with industry
- graduate education for Ph.D. students
- experimental facilities

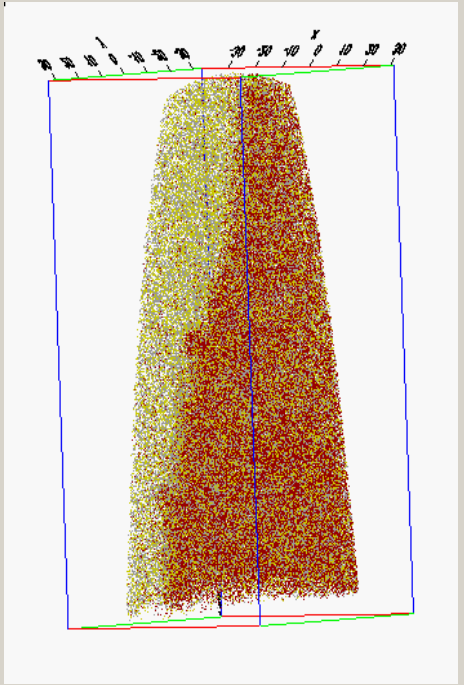
example: Atom Probe Tomography

http://www.4TU.nl/HTM

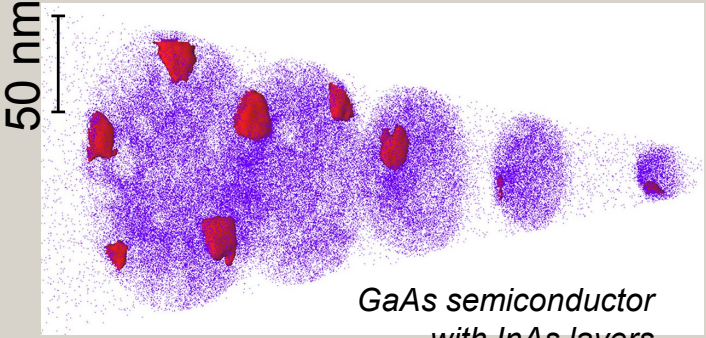
Atom Probe Tomography

- element-specific 3D microscopy at the atomic scale
- can be combined with TEM
- applicable to many types of materials
- National Facility at TU Eindhoven
- high running costs: *high usage degree needed!*

- poster & demo dr. Sebastian Kölling (S.Kolling@tue.nl)
- contact prof. Paul Koenraad (P.M.Koenraad@tue.nl)



Martensite and austenite in steel (scale in nm)



GaAs semiconductor with InAs layers

4TU.

Equipment website:
http://materialsequipment.4tu.nl/

- specifications and contact for equipment at the four universities
- Delft and Twente are filling the database now, Eindhoven and Wageningen to follow
- the website is accessible, but no yet complete
- feedback is very welcome

- Mithun Mendez
  mithun.martin.215@gmail.com

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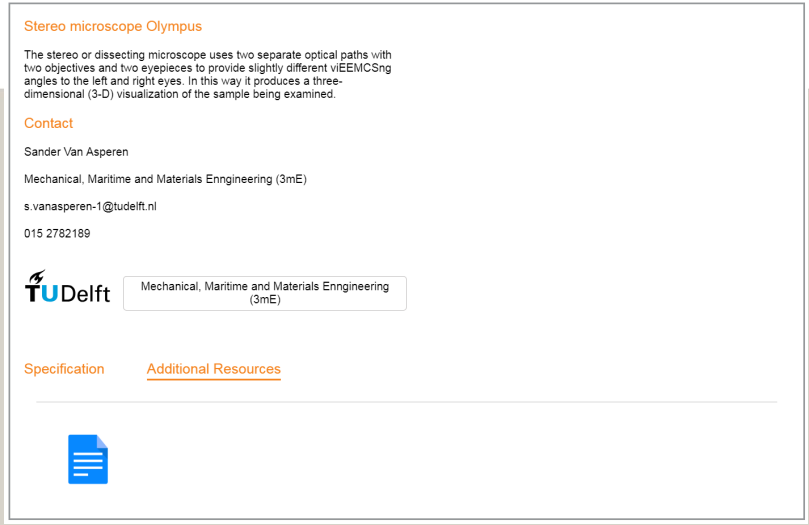
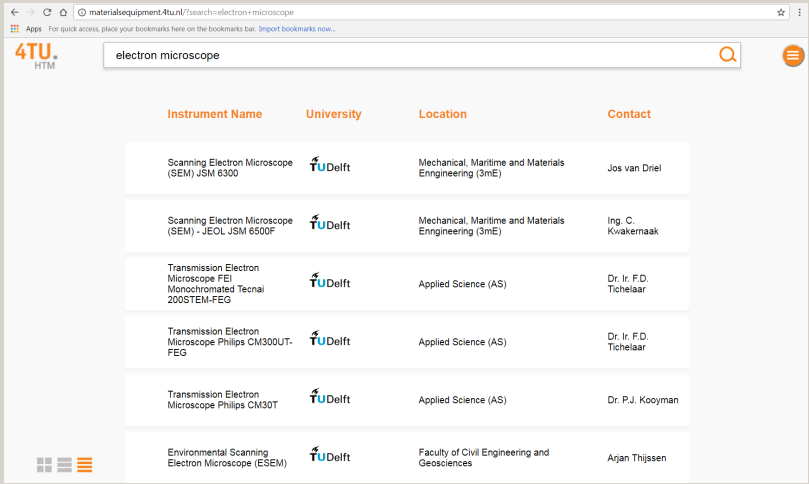
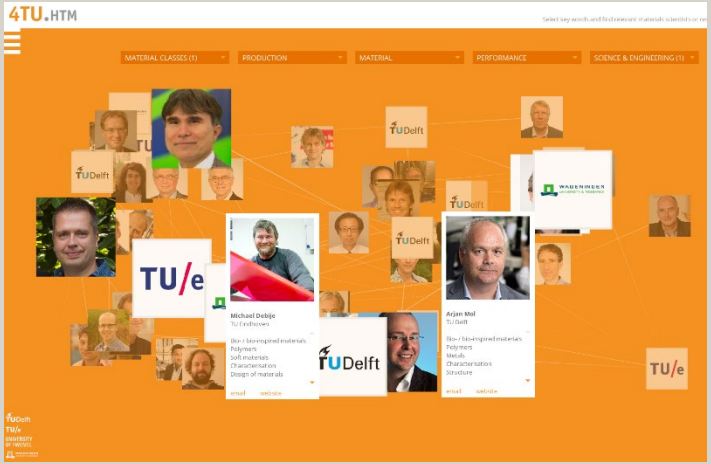




Website to find materials expertise

http://hightechmaterials.4tu.nl/



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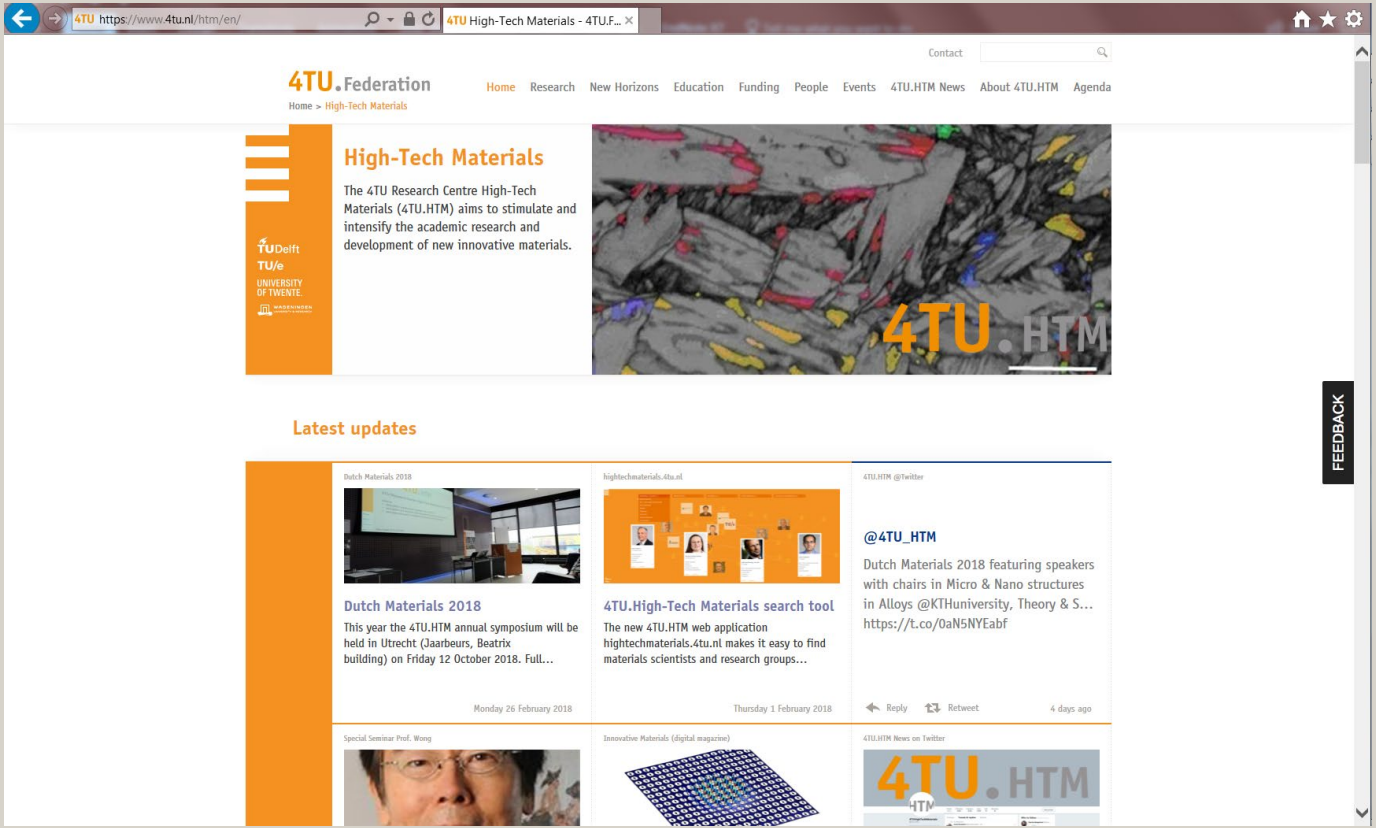
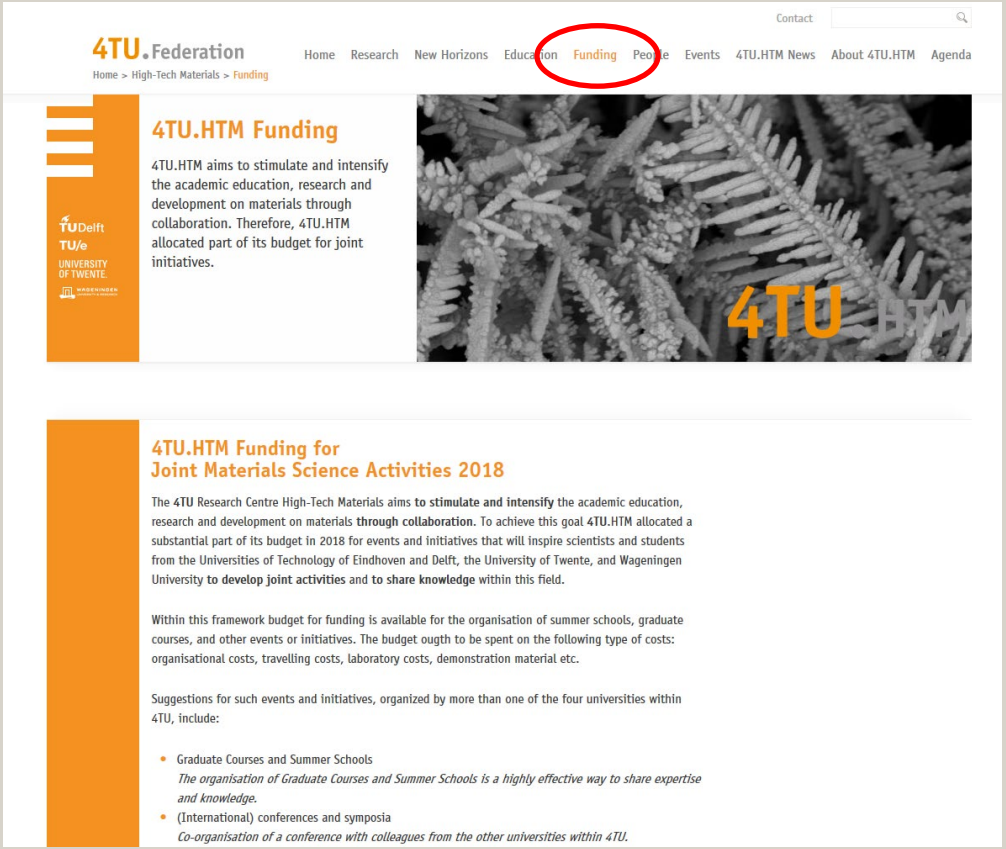


website http://www.4TU.nl/HTM: Funding for collaboration



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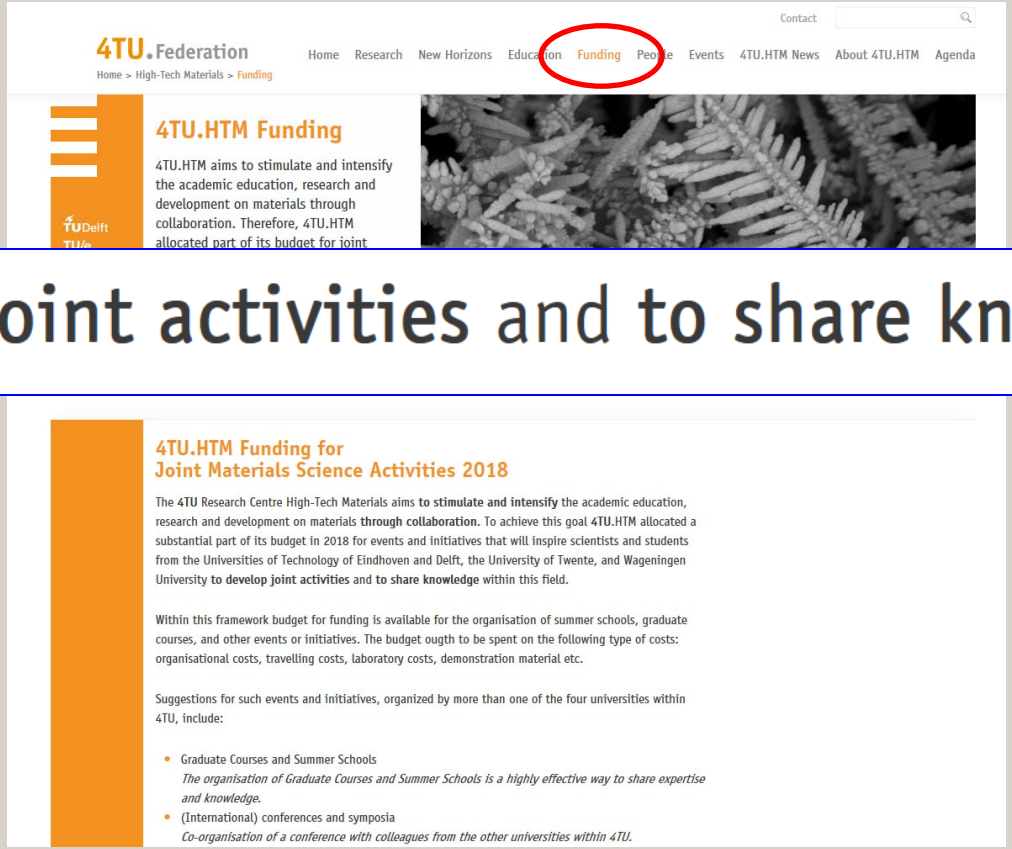

to develop joint activities and to share knowledge

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Active community

- Organise joint activities
- Graduate Courses
- Draw attention to Materials Science and Engineering
- Development of demonstration material
- .....

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Today: fourth 4TU.HTM symposium *Dutch Materials*

prof. Nicola Marzari (École Polytechnique Fédérale de Lausanne (EPFL))
Discovering novel materials: the convergence of high-performance computing, high-throughput computing, and data analytics

Haixing Fang, M.Sc. (Novel Aerospace Materials, TU Delft)
Direct view of self-healing in creep alloys

Coffee Break

prof. Annika Borgenstam (KTH Royal Institute of Technology, Stockholm)
On the development of theoretical and experimental tools for materials design of high strength steels and cemented carbides

dr. Carola Celada-Casero (Materials Science and Engineering, TU Delft)
Understanding microstructural changes for the design of advanced steels

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Coffee Break

prof. Jilt Sietsma (Materials Science and Engineering, TU Delft)
Nucleation of phases in metallic microstructures

dr. Carola Celada-Casero (Materials Science and Engineering, TU Delft)
Understanding microstructural changes for the design of advanced steels

After lunch, 13:30 – 15:00 h

New Horizons in Designer Materials

Amir Mirza Gheytaghi (TU Delft), *Superconducting Carbon Nanotubes composite as Vertical Interconnect for Qubit Integration at Cryogenic Temperature*

Matthew Hendrikx (TU/e), *Communicating Surfaces*

Mohammad Moradi (TU/e), *Structure formation in hierarchical hybrid materials through in situ liquid phase microscopy*

Maciek Kopeć (UTwente), *Towards Advanced, 3D Materials Bottom-Up, from Polymer Decorated Nano- and Microstructures*

Posters of all research projects

Coffee Break

dr. Sissi de Beer (Materials Science and Technology of Polymers, UTwente)
Wetting of polymer brushes by polymeric nanodroplets

dr. Ruben Higler (Physical Chemistry and Soft Matter, WUR)
Anomalous dynamics and phase behaviour of dopants in weak crystals

prof. Kurt Kremer (Max Planck Institute for Polymer Research)
Multiscale Modeling and Design of Smart Polymers

16:45 h: **Drinks**

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Contact:
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