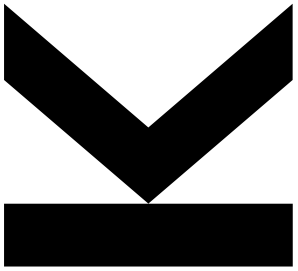
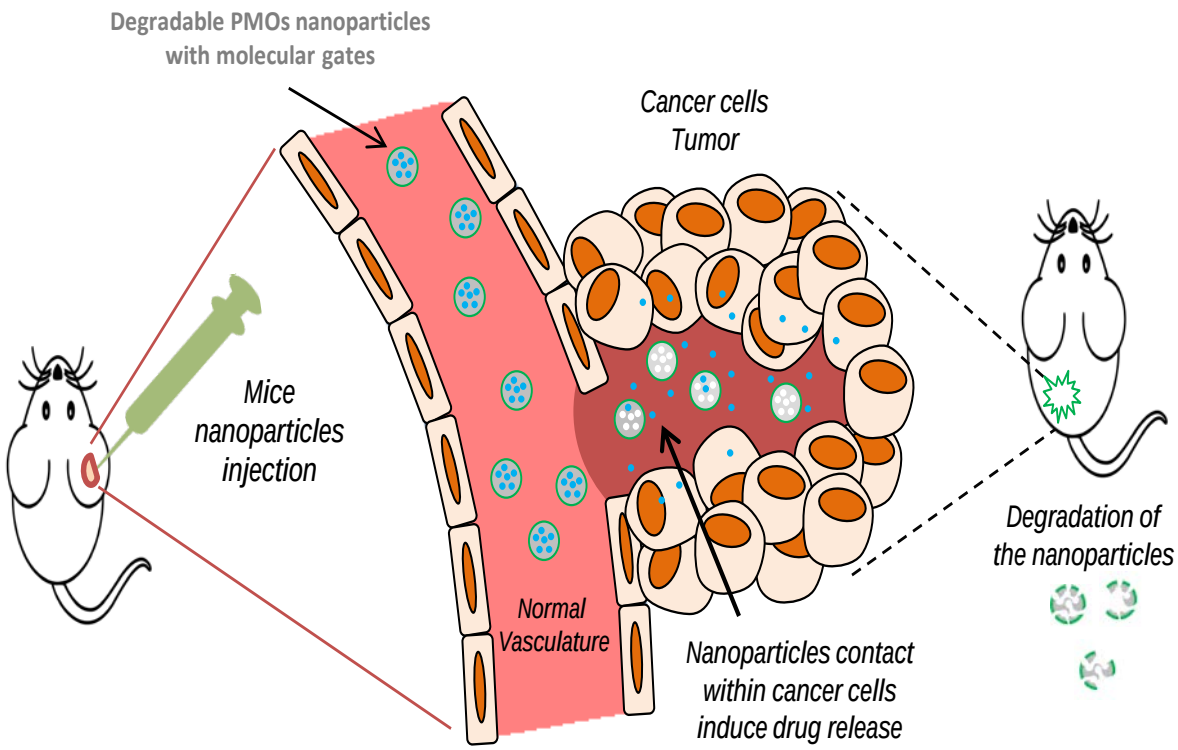
OVERVIEW OF LIT PROJECTS, CALL 2/2016



TARGETED DRUG DEVELOPMENT

LIT YOUNG CAREER PROJECT: DEGRADABLE HYBRID ORGANOSILICA PHOSPHAZENE MESOPOROUS NANOPARTICLES FOR NANOMEDICINE (DEG-PMO)



- When it comes to targeted drug therapies, nanomedicine is very promising. Current drug carrier materials, however, have proven to be less than ideal. **Dr. Yolanda Salinas** and her interdisciplinary team of bio-physicists and chemists are developing new, degradable, poly phosphazene-based nanoparticles for targeted drug delivery where it is needed in the human body, such as applying therapy directly on cancerous tumors.

Yolanda Salinas, Institute of Polymer Chemistry

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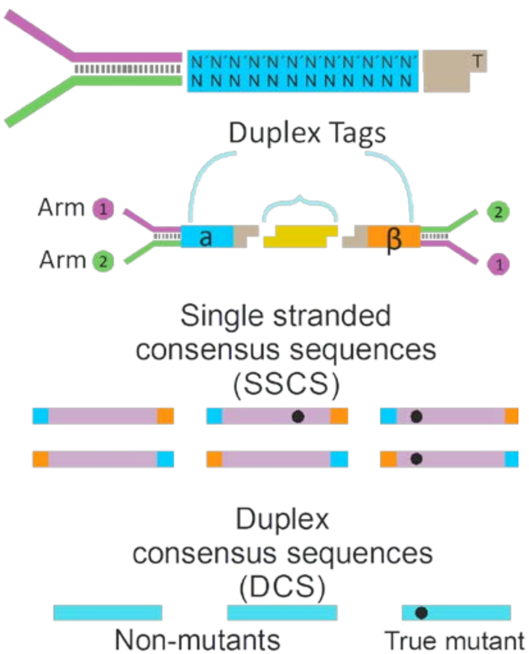
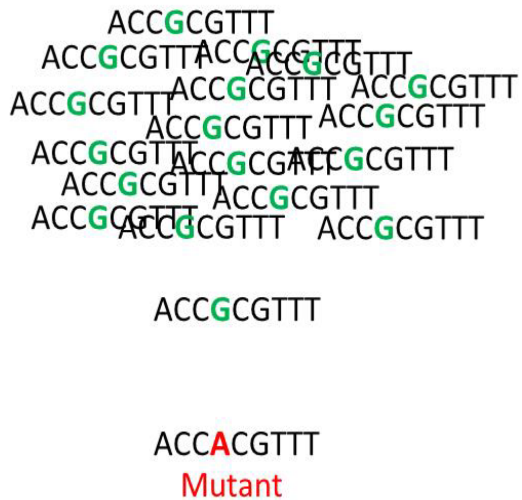
FINDING DANGEROUS MUTATIONS

LIT SEED PROJECT: DISCOVERY OF NEW MUTATIONS WITH ULTRA-SENSITIVE SEQUENCING (USS) / MUT_USS

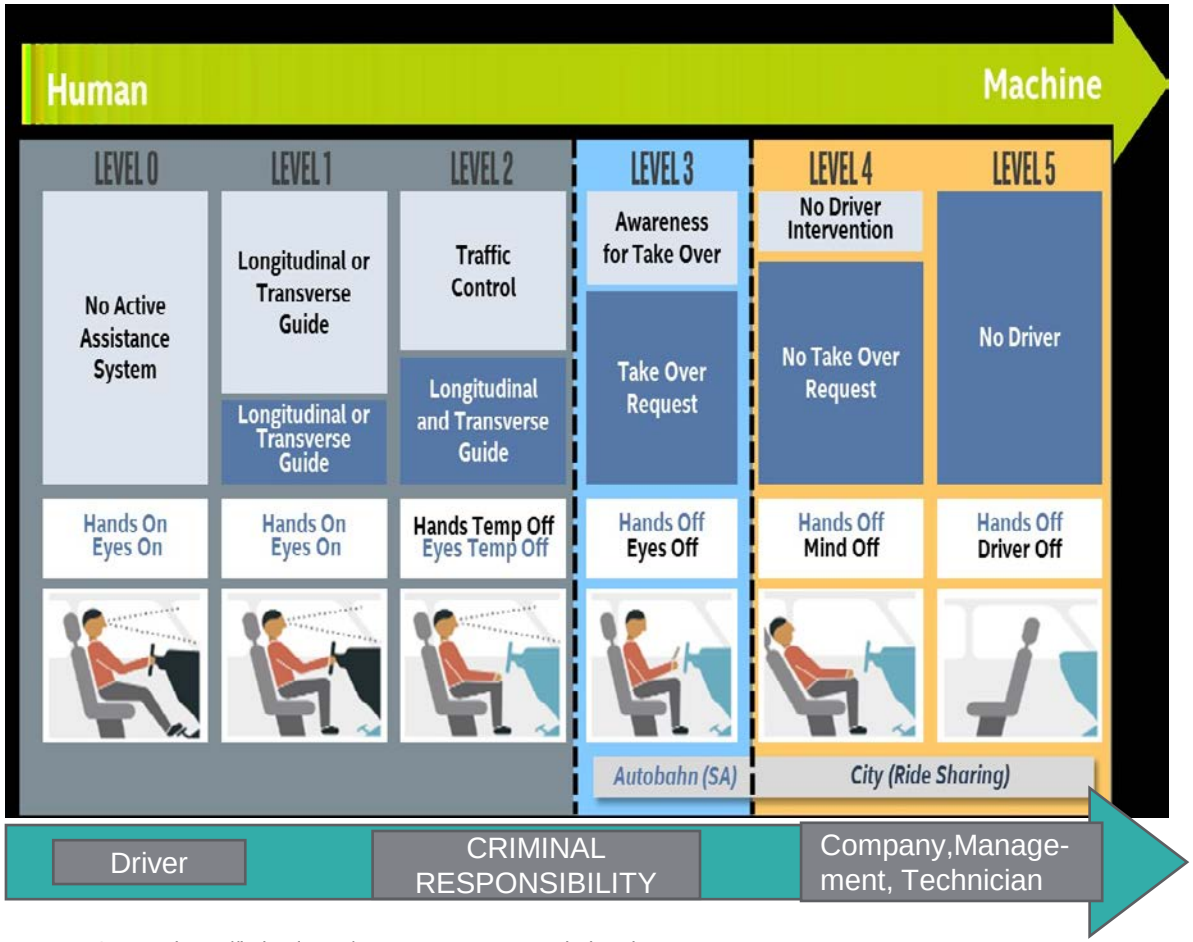




- When cells divide during fertilization, mutations can occur resulting in serious effects ranging from health issues to dwarfism. **Assoc. Prof. Dr. Irene Tiemann-Boege** and her team are developing ultra-sensitive sequencing technology to not only find new mutations, but also be less susceptible to error than conventional sequencing methods.

CRIMINAL LAW FOR SELF-DRIVING VEHICLES

LIT SEED PROJECT: AUTONOMOUS DRIVING IN AUSTRIA (AUD/A) – PRE-CONDITIONS BY, AND A CHALLENGE FOR CRIMINAL LAW



Source: https://iq.intel.com/autonomous-cars-road-ahead

- Although there have been significant advancements in the development of autonomous vehicles, there is no clear legal framework pertaining to criminal responsibility. **Dr. Karin Bruckmüller** and her team are working on drafting clear and detailed legislation for engineers, developers and producers in Austria and Europe. It will include addressing ethical issues, such as in the event of accident, determining if a group of adults or a child should be put in deadly danger.

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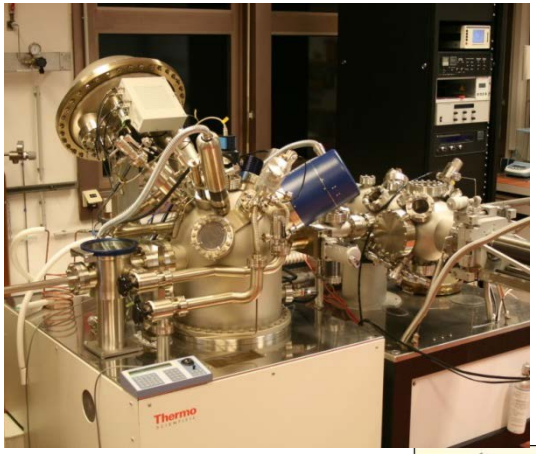
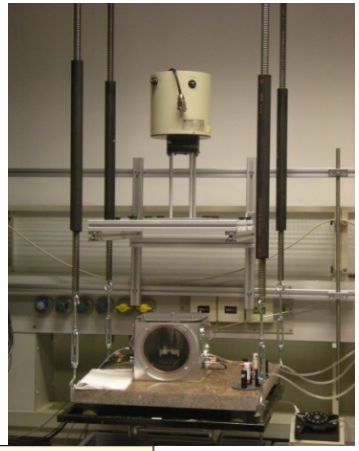
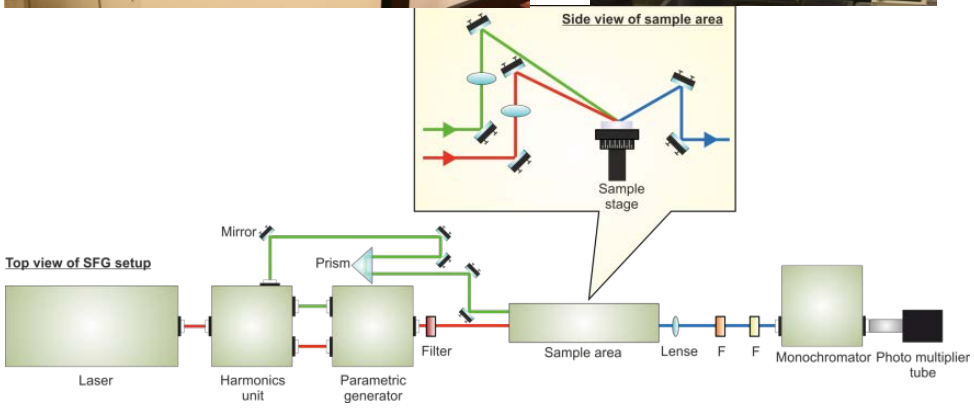
IMPROVED SIGNAL PROCESSING

LIT ADVANCE PROJECT: HARMONIUM



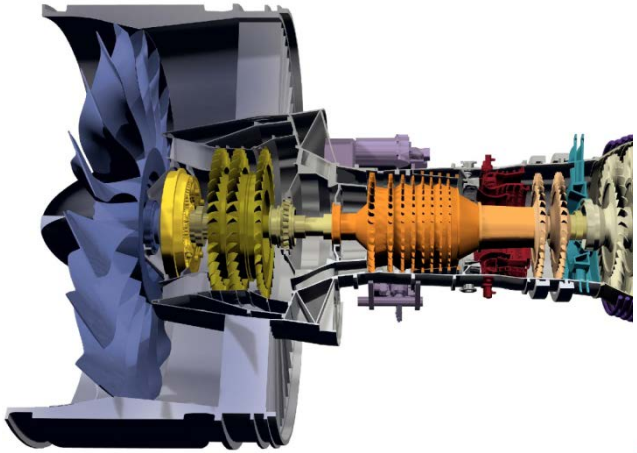


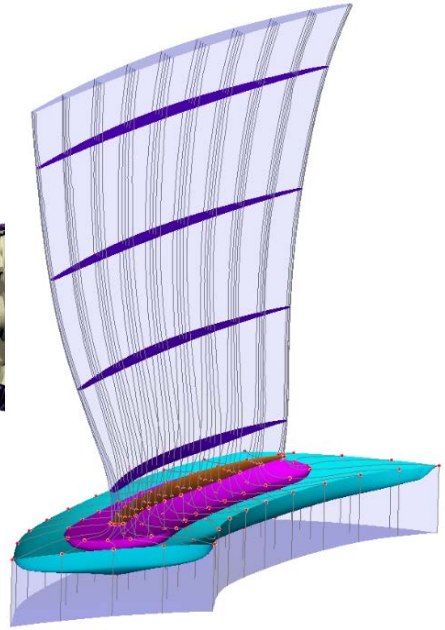


- **Univ. Prof. Dr. Kurt Hingerl** and his team are working on pragmatic ways to strengthen optical communication and signal processing systems in mechanical, optical, and electrical hardware. The idea is to use rapid phase changes of new, environmentally compatible and non-toxic perovskites on a nanometer scale.

EQUATIONS WITH MILLIONS OF UNKNOWNS

LIT YOUNG CAREER PROJECT: FAST MULTIGRID SOLVERS FOR ADVANCED DISCRETIZATION TECHNIQUES IN ISOGEOMETRIC ANALYSIS





- Iso-geometric analyses (the integration of CAD and numerical simulations) are widely used at the moment. However, a solution for larger equation systems containing millions of unknowns can often create problems. **Dr. Clemens Hofreither** is developing innovative and highly efficient numerical solutions to dramatically accelerate scientific and industrial simulations.

c MTU Aero Engines

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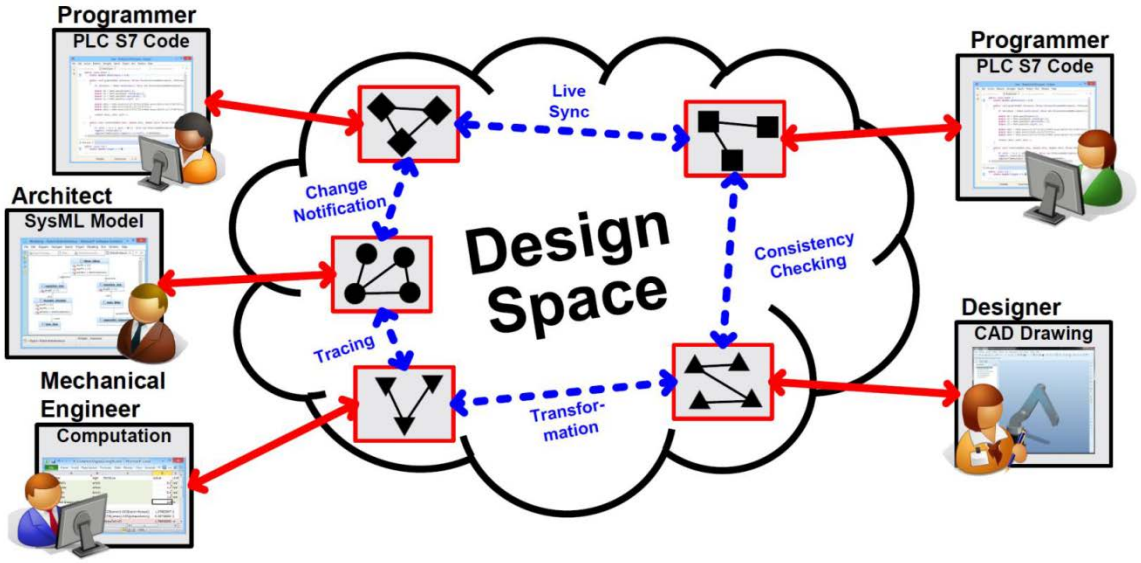
ENGINEERING CLOUD: DETECTING AND CORRECTING DEVELOPMENT ERRORS

LIT SEED PROJECT: CEME - COLLABORATIVE ENGINEERING IN A MULTI-TOOL ENVIRONMENT



- Several teams can sometimes be involved in new technological developments at once, often working parallel to each other instead of together. **Univ. Prof. Dr. Alexander Egyed** and his team of computer and mechatronic scientists are developing an “Engineering Cloud”, in which various developments can be automatically synchronized, reviewed, and tracked. Design flaws can be detected faster and then eliminated.

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THIN-FILM CAMERAS FOR NEW APPLICATIONS

LIT SEED PROJECT: MOVING TOWARDS A FLEXIBLE, SCALABLE, AND TRANSPARENT THIN-FILM CAMERA

Cylindrical shaped sensor that supports transparency supports color imaging depth scanning.

- Conventional cameras are limited in their possibilities as they are made using image sensors and lenses, making them inflexible and opaque. **Univ. Prof. Dr. Oliver Bimber** and his team are developing the first thin-film flexible, scalable, and transparent camera only a millimeter thick in size. They can, for example, be seamlessly integrated into objects and environments and cover class sizes ranging from centimeters to meters.

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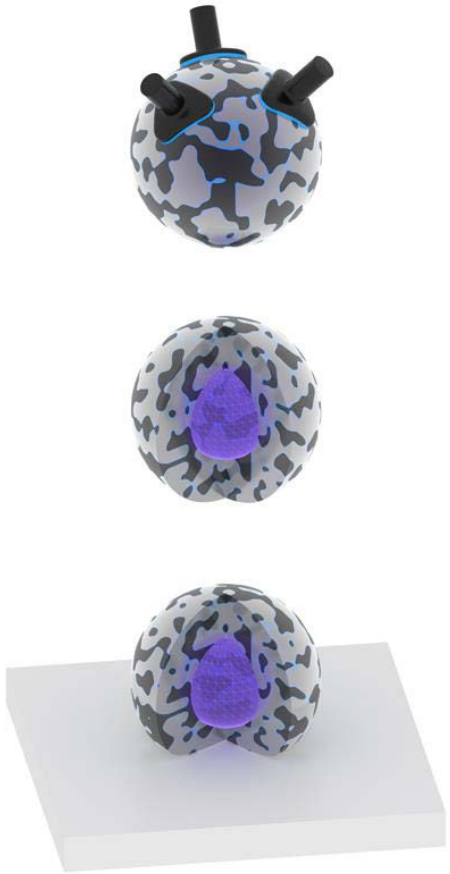
SOFT MULTI-MATERIALS FOR TAILORED DAMPING ELEMENTS

LIT SEED PROJECT: FROM MULTIMATERIAL ADDITIVE MANUFACTURING OF DAMPERS TO TAILORED VISCOELASTIC DISSIPATION (ADAPT)



- Without damping elements daily life would be literally hard - they reduce or completely suppress unwanted motion. Together with an interdisciplinary team of physicists and polymer scientists, **Assoc.Univ. Prof. Dr. Ingrid Graz** and **Dr. Umut Cakmak** are developing soft composite-structures made of rubber, gels, and liquids. Exploiting these materials´ viscoelastc properties tailored damping elements will be prepared by additive manufacturing.

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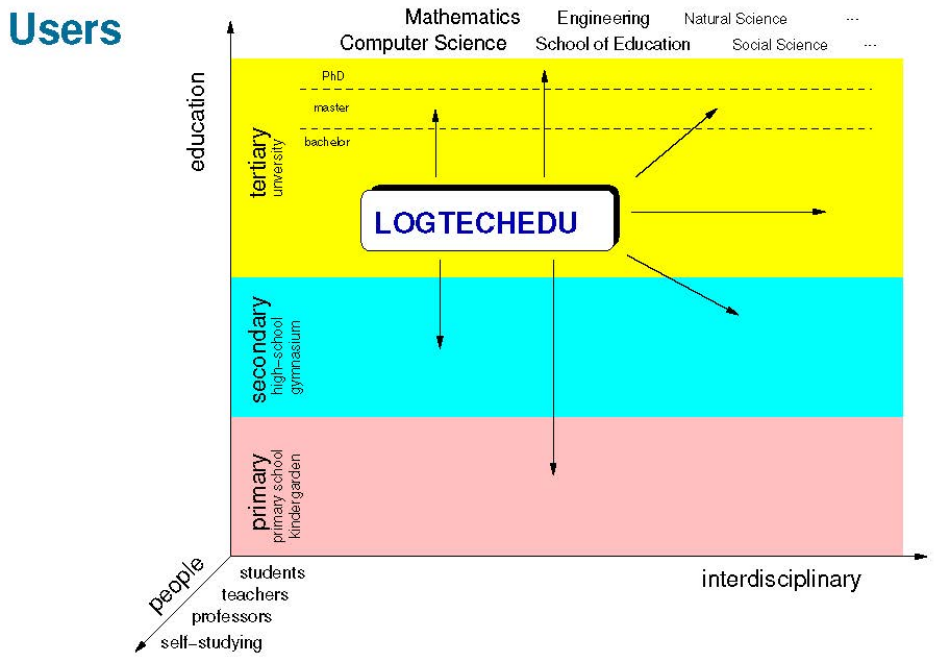
LOGIC-BASED SOFTWARE FOR THE CLASSROOM AND FOR LEARNING

LIT SEED PROJECT: LOGIC TECHNOLOGY FOR COMPUTER SCIENCE EDUCATION (LOGTECHEDU)



From STEM bachelor to other disciplines and education levels.

- "Computational thinking" is a core competency when it comes to computer sciences in the 21st century and beyond. Logic is the language and Univ. Prof. **Dr. Armin Biere** and his team have developed teaching technology based on logically comprehensible tools. As a result, computers can be used as a classroom aid for teaching and learning in all areas of engineering and natural sciences as well as for independent studies.

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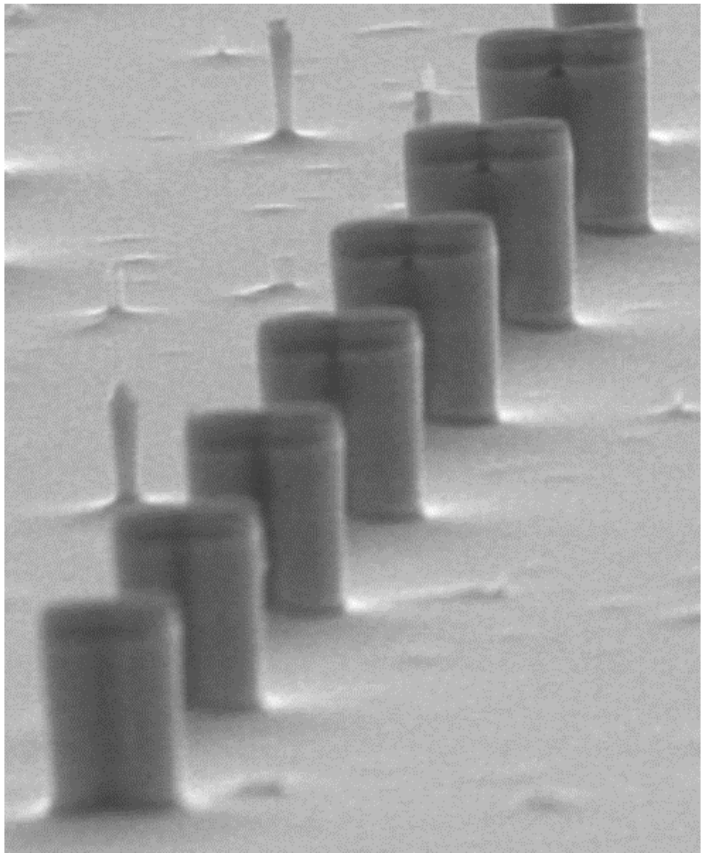
IN THE HEART OF QUANTUM TECHNOLOGIES

LIT SEED PROJECT: CAVITY-ASSISTED NON-CLASSICAL LIGHT STATES GENERATION WITH QUANTUM DOTS FOR INTEGRATED QUANTUM PHOTONICS / CANDOTQIP



- The quantum state describes an isolated quantum system’s state. If we know what the quantum state is, we can predict the system’s behavior. If a certain state ("fock state") is superimposed with other states, it cannot be understood using conventional signals. **Dr. Gabriela Slavcheva** is currently working on a solution to bind resonators to quantum emitters.

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HARDWARE FOR FUTURE QUANTUM TECHNOLOGIES

LIT YOUNG CAREER PROJECT: MIXED FINITE ELEMENTS FOR SMART MATERIALS AND STRUCTURES / MIFESMS

- **Assist. Prof. Dr. Astrid Pechstein's** interdisciplinary project combines mechatronics and mathematics in an effort to develop efficient three-dimensional finite elements for the precise and rapid simulation of piezoelectric structures. The idea is to be able to control vibration problems and noise emissions. Practical applications include aviation and medical technology, such as reducing the noise level inside of a magnetic resonance tomography machine.

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