THE CLUSTER brings together the teams of about 60 investigators from two universities and several research institutes in Saxony:

// Technische Universität Dresden
// Technische Universität Chemnitz
// Helmholtz-Zentrum Dresden-Rossendorf (HZDR)
// Leibniz Institute of Polymer Research Dresden e.V. (IPF)
// Leibniz Institute for Solid State and Materials Research Dresden (IFW)
// Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG)
// Max Planck Institute for the Physics of Complex Systems (MPI-PKS)
// Fraunhofer Institute for Electronic Nano Systems (Fraunhofer ENAS)
// Fraunhofer Institute for Ceramic Technologies and Systems (Fraunhofer IKTS)
// Nanoelectronic Materials Laboratory gGmbH (NaMLab)
// Kurt Schwabe Institute for Measuring and Sensor Technology Meinsberg e.V. (KSI)

COORDINATOR // Prof. Dr. Gerhard Fettweis

PROGRAM OFFICE //

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ADVANCING ELECTRONICS beyond conventional technologies is the major aim of the TU Dresden Cluster of Excellence Center for Advancing Electronics Dresden (cfaed). Using a unique approach, the Cluster’s scientists are working interdisciplinary – engineers with biologists, physicists with computer scientists – to overcome the boundaries that modern semiconductor technologies will reach in future.

cfaed researchers are investigating how new materials and technologies can keep up with the ever-increasing demands of the Information Society. For example, using the fascinating self-organization of DNA-origami could result in new circuit devices and inventing completely new forms of lightning, printing or audio video systems will push the use of organic electronics further. A chemical chip might be the nucleus for a new ‘lab on a chip’. Of course, cfaed scientists are also researching ways to create more energy-efficient and more resilient appliances and ways to orchestrate systems which become more and more heterogeneously.

Dresden Center for Nanoanalysis (DCN) has been established as an interdisciplinary technological platform of Technische Universität Dresden and cfaed in the field of 4D nanoscale materials analysis.

In order to foster young talents who are contributing to this ambitious enterprise, cfaed has initiated an innovative Career Development Program which aims at systematically guiding researchers through their scientific careers.

The Industry Liaison Program will support the work of the Cluster and enables local and international industry to participate in cfaed. In return, researchers will keep in touch with the latest developments and demands from industry.

cfaed’s vision of the future is a world in which more and more people can participate in modern way of life. //

Gerhard Fettweis — cfaed Coordinator

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THE FUTURE LAB

FACTS & FIGURES

FUNDING VOLUME // € 34 million
FUNDING PERIOD // 1 Nov 2012 – 31 Oct 2017
FUNDING BODY // German Research Foundation (DFG)
PARTICIPATING INSTITUTIONS // 11
INVESTIGATORS // ~ 60
RESEARCH AREAS // 9 paths
PARTICIPATING SCIENTISTS // ~ 250

PATH A // Silicon Nanowire
Investigating special properties of silicon nanowire based circuits and creating a technology platform for biosensing.

PATH B // Carbon
Enabling high-performance RF communication systems by using nano-scale carbon-based electronics.

PATH C // Organic/Polymer
Enabling new organic information processing systems by exploiting the promising advantages of organic materials.

PATH D // Biomolecular-Assembled Circuits
Investigating how DNA-origami could create a new manufacturing paradigm, using the self-assembling properties of DNA.

PATH E // Chemical Information Processing
Developing a new ‘lab-on-chip’ concept based on components which actively process chemicals information (composition, physical state, concentration, etc.).

PATH F // Orchestration
Orchestrating heterogeneous electronic systems by automatic adaption of applications and software systems.

PATH G // Resilience
Minimizing the costs of resilience by focusing on flexible, application-specific, adaptive resiliency mechanisms.

PATH H // HAEC
The Collaborative Research Center HAEC (Highly Adaptive Energy-Efficient Computing) contributes to cfaed by focusing on large-scale multichip computing platforms for a new quality of energy-efficient computing.

PATH I // Biological Systems
Unraveling engineering principles of biological systems to inspire novel electronics.

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// By implementing a more shots on goal approach, we want to maximize the chances for high impact technological breakthroughs which are based on new materials. This can only be achieved if complete system solutions are considered: from materials all the way to large-scale integrated processing systems. We therefore comprehensively address all three Abstraction Layers: Materials & Functions, Devices & Circuits, and Information Processing. //