DFG Graduiertenkolleg 1564

(Research Training Group 1564)

Imaging New Modalities

Multimodal Image Acquisition and Analysis for Civil Security Applications

State-of-the-Art

- Commercial imaging civil security systems
  - Based on gray-scale- or RBG-images/videos **or**
  - Microwave/X-ray („nude scanner“) **or**
  - Fluorescence- o. mass spectroscopy (chem. Detection)
- Current research mainly focuses on
  - mono-modal approaches and
  - “classical” sensors
- At the same time: Significant research success in
  - new imaging sensors
  - new algorithms for data processing and analysis

Research Requests for Civil Security

- Sensor research
  - Development of new fundamental sensor concepts
  - Concepts for integration of multi-modal systems (Goal: Functional enhancement and robustness)

Modalities: Multi-spectral, THz & Range

- Techniques for processing & analysis of sensor data
  - Data processing for new modalities
  - Algorithms for multi-modal sensor systems
  - Data security & data privacy concepts

Profile of the Research Training Group

- What is the scientific motivation?

Integrated Research (in the civil security context)

1. new sensor techniques & sensor combinations,
2. new techniques for mono- and multi-modal data processing and analysis
3. techniques for data security & privacy

- Why a Research Training Group?

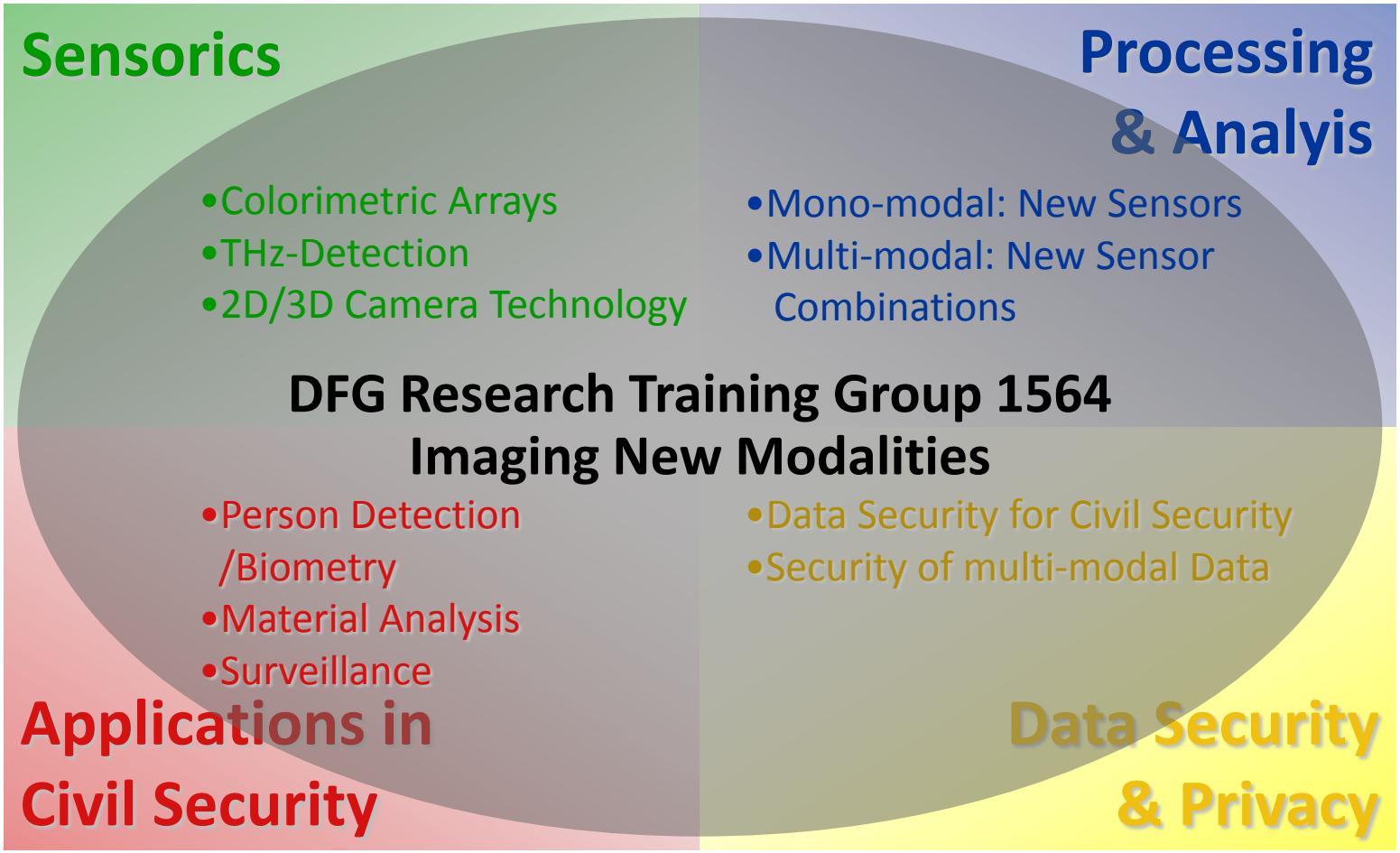
The structure of a Research Training Group supports

1. integration of this interdisciplinary topic,
2. teaching of complementary foundations and
3. sensitization of social aspects

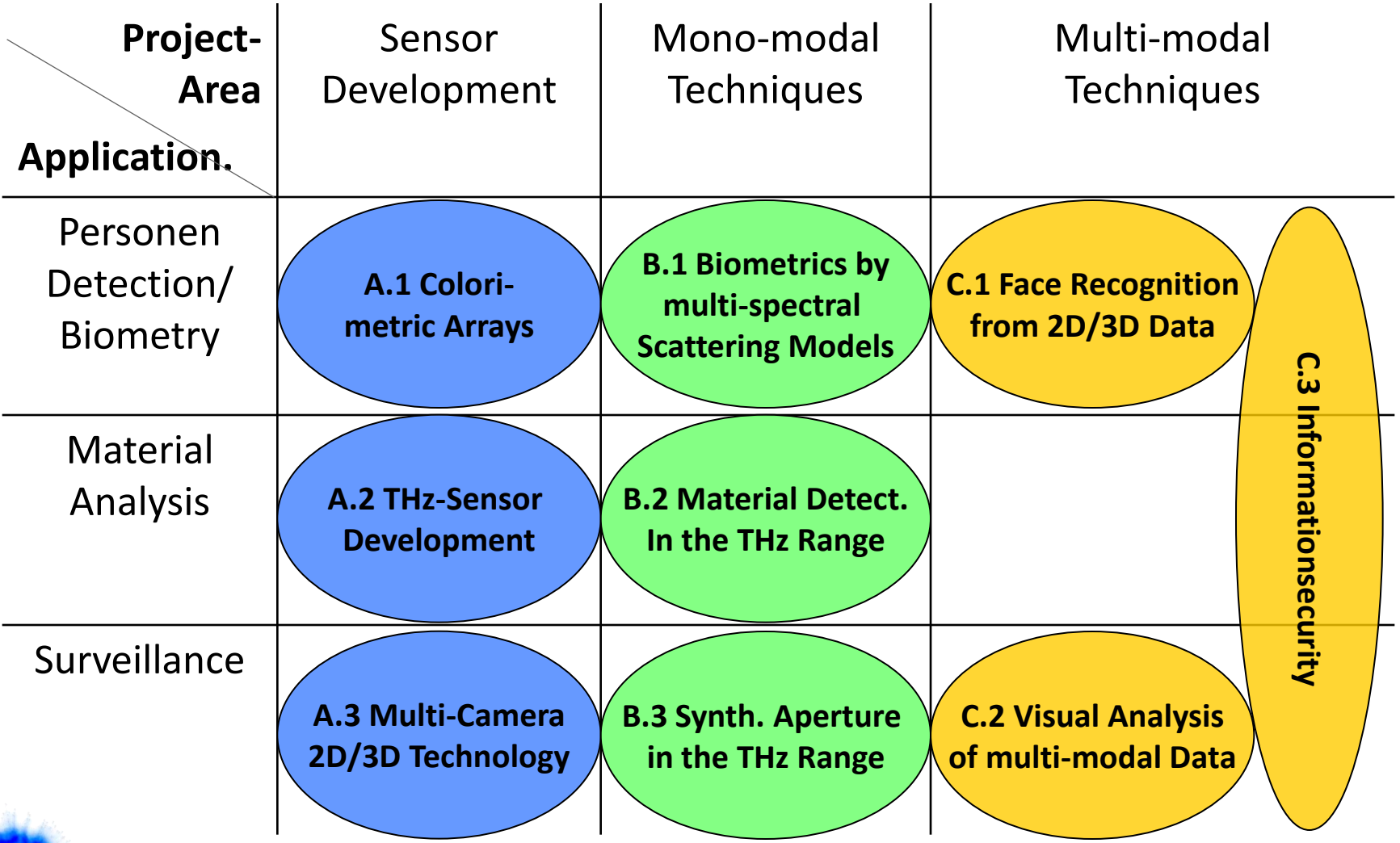
Scientific Environment

- Long Research Tradition in Sensorics in Siegen
  - Faculty Electrical Engineering & Computer Science makes sensor research for some 30 years
  - Center for Sensor Systems (ZESS) is 20 years active
- Research Foci
  - Classical imaging sensorics incl. chip-, camera- and application development
  - Further modalities: Radar, range sensors (PMD) & THz
- Goal: Linking together these research areas on a level of fundamental research & combine it with
  - Data security and data privacy

Foci of the Research Training Group



Projects & Cooperations



Project Managers

- Prof. Dr. rer. nat. Volker Blanz - B1, B2, C1, C2
- Prof. Dr.-Ing. Markus Böhm - A1
- Prof. Dr.-Ing. Peter Haring Bolívar - A2, B2, B3
- Prof. Dr.-Ing. Andreas Kolb - A3, B1, C2, C3
- Prof. Dr.-Ing. Otmar Loffeld - A1, A3, B3
- Prof. Dr. rer. nat. Ullrich Pfeiffer - A2
- Prof. Dr. rer. nat. Christoph Ruland - C1, C3
- JProf. Dr.-Ing. Marcin Grzegorzek - B2, C1, C2

Study Programme: Scientific Course

- Introductory Courses
  - Complementary to prior work
  - Mandatory: Information Security

- Courses at Research Level
  - Address specific research topics
  - **Guest researchers**

Study Programme: Soft Skills

- Classical Soft-Skills, e.g.
  - Languages, Law, Economy [KoSI, Competence Center of the University]
- Scientific Soft Skills

- Ethics (IZEW, University of Tübingen)
  - Ethical Foundations in Research
  - Evaluation of own Project

Study Programme: Group Seminar

- Regular Meeting, every 2-3 weeks
  - Informal exchange & presentations of research results
  - GRK members can/shall quote topics for the meeting
  - Open informal atmosphere for discussions
  - Rehearsals for presentations at conferences
- Further elements of “intra-professional exchange”
  - Introduction of the web-based platform (Wiki) for planning and information collection
  - Excursions

Study Programme: Doctoral Seminar

- Bi-yearly formal meeting – “Spring Presentations” / “Fall Presentations” with IPP and MOSES
- Goal: Development/evolution of research plan
  - Determine individual goals
  - Presentation of latest results
  - “Fall Presentations” have “conference style”

Thank you for your attention