

RP4: Genomics and Proteomics of Plant Systems

Prof. RNDr. Jiří Fajkus, CSc.
Research Programme Coordinator

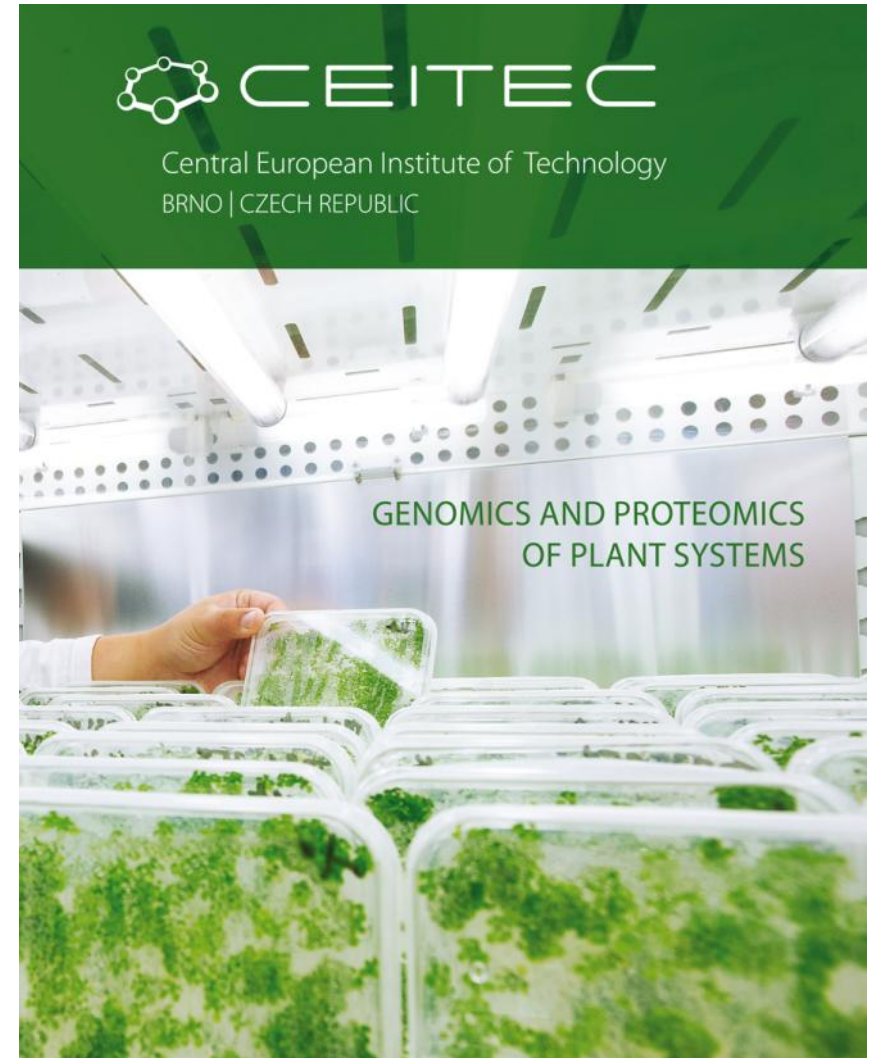
9 / 80 / 71,6 / 16

RGs/total employees/FTE/share of PhD

293 / 12 / 16 mil. CZK/EUR/USD

Investment (equipment)

Prof. Dirk Inzé
Responsible member of ISAB



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Genomics and Proteomics of Plant Systems

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Research Directions – part 1

- Genome, karyotype and chromosome evolution; the role of repetitive DNA in genome dynamics; the structure, evolution and maintenance of telomeres and their role in chromosome stability and plant speciation; epigenetic regulations
- Molecular mechanisms governing hormonal regulations and their functions in plant development and stressresponse; developmental outputs of subcellular protein trafficking and cell polarity will be established

Research Groups | Research Group Leaders

- **RG-4-1** | Bioanalytical Instrumentation | **František Foret**
- **RG-4-2** | Plant Cytogenomics | **Martin A. Lysák**
- **RG-4-3** | Functional Genomics and Proteomics of Plants | **Jan Hejátko**
- **RG-4-4** | Plant Stress Signalling and Adaptation | **Vanesa Tognetti**
- **RG-4-5** | Metabolomics | **Zdeněk Glatz**
- **RG-4-6** | Core Facility - Proteomics | **Zbyněk Zdráhal**
- **RG-4-7** | Developmental and Cell Biology of Plants | **Jiří Friml**
- **RG-4-8** | Chromatin Molecular Complexes | **Jiří Fajkus**

Research activities – potential projects and collaboration with Norwegian partners

- Hormonal regulations of plant development
 - **Identification of molecular mechanisms underlying biomass formation and cell wall composition in Arabidopsis**
 - Jan Hejatko, jan.hejatko@ceitec.muni.cz
- Epigenetics and genome stability, telomeres in cancer cells
 - **Telomeres, chromatin structure and DNA damage response**
 - Jiri Fajkus, jiri.fajkus@ceitec.muni.cz
- Proteomics – complete expertise for protein separation, characterization etc.
 - Zbynek Zdrahal, zbynek.zdrahal@ceitec.muni.cz
- Plant stress signalling and adaptation – reactive oxygen species crosstalk with auxin
 - Vanesa Tognetti, vanesa.tognetti@ceitec.muni.cz

RP3: Structural Biology

Prof. RNDr. Vladimír Sklenář, DrSc.
Research Programme Coordinator

15 / 67 / 65,5 / 13

RGs/total employees/FTE/share of PhD

601 / 24 / 32 mil. CZK/EUR/USD

Investment (equipment)

Prof. Hartmut Oschkinat
Responsible member of ISAB



Central European Institute of Technology
BRNO | CZECH REPUBLIC

STRUCTURAL BIOLOGY



Structural Biology Research Programme I.

Research Activities

- **Investigation of the role of RNA in development and human diseases**
RGs: RNA Quality Control, RNA-based regulation of gene expression, Structural Biology of Gene Regulation
- **Therapeutic aspects of recognition and adhesion phenomena in host-pathogen interactions**
RGs: Glycobiology, Computational Chemistry
- **Visualisation and modification of biological objects including tissues, cells, cellular structures, and biomolecules**
RGs: Nanobiotechnology, Structure and Interaction of Biomolecules at Surfaces
- **Development of new methodologies for investigating the structure, interactions and dynamics of biomolecules**
RGs: CD Spectroscopy of Nucleic Acids, Biomolecular NMR Spectroscopy, Structure and Dynamics of Nucleic Acids, Bioinformatics

Structural Biology Research Programme II.

Research Activities

- High throughput structural characterisation of macromolecular assemblies by **single crystal diffraction**
RGs: X-ray Crystallography, Structural Virology
- Establishing a high-end **cryo-electron microscopy** laboratory for 3D imaging studies for structural biology at the cellular level
RG: CryoEM

Proposals for Norway Funds

- **Structural Virology (Pavel Plevka, Ph.D., pplevka@purdue.edu)**

Numerous viruses from the order *Picornavirales* cause disease in humans (picornaviruses) or are economically important pathogens of honeybee (iflaviruses and dicistroviruses). We propose to study **molecular structures of representative viruses** from these families and their life cycle intermediates in order to provide **mechanistic description of genome replication and virion assembly**. In addition, our results will lay the foundations for structure-based development of antiviral drugs.

We will use X-ray crystallography and molecular biology methods for the structural study. However, we would appreciate a collaboration with partners experienced in **cryo-electron microscopy or computational chemistry**.