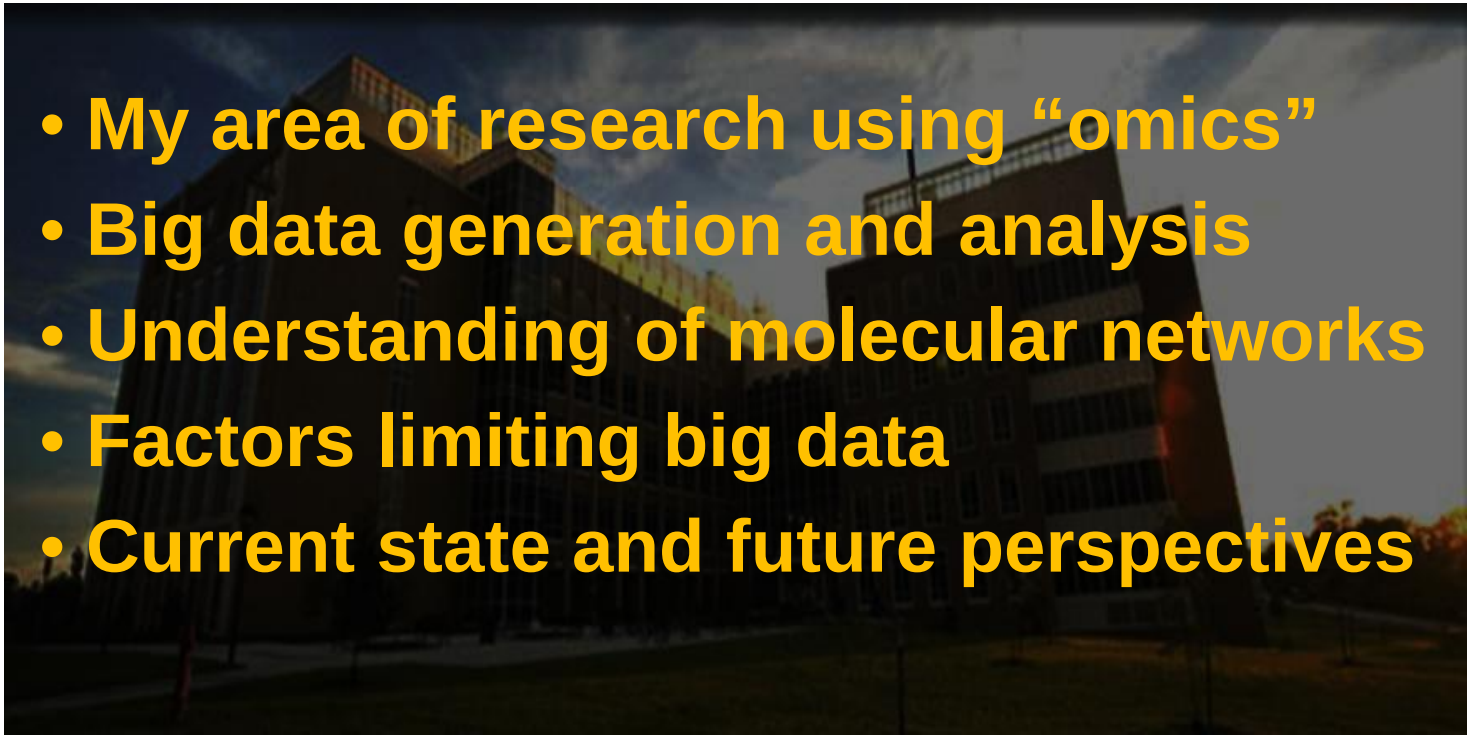
Proteomics Data Generation and Analysis Toward Systems Biology



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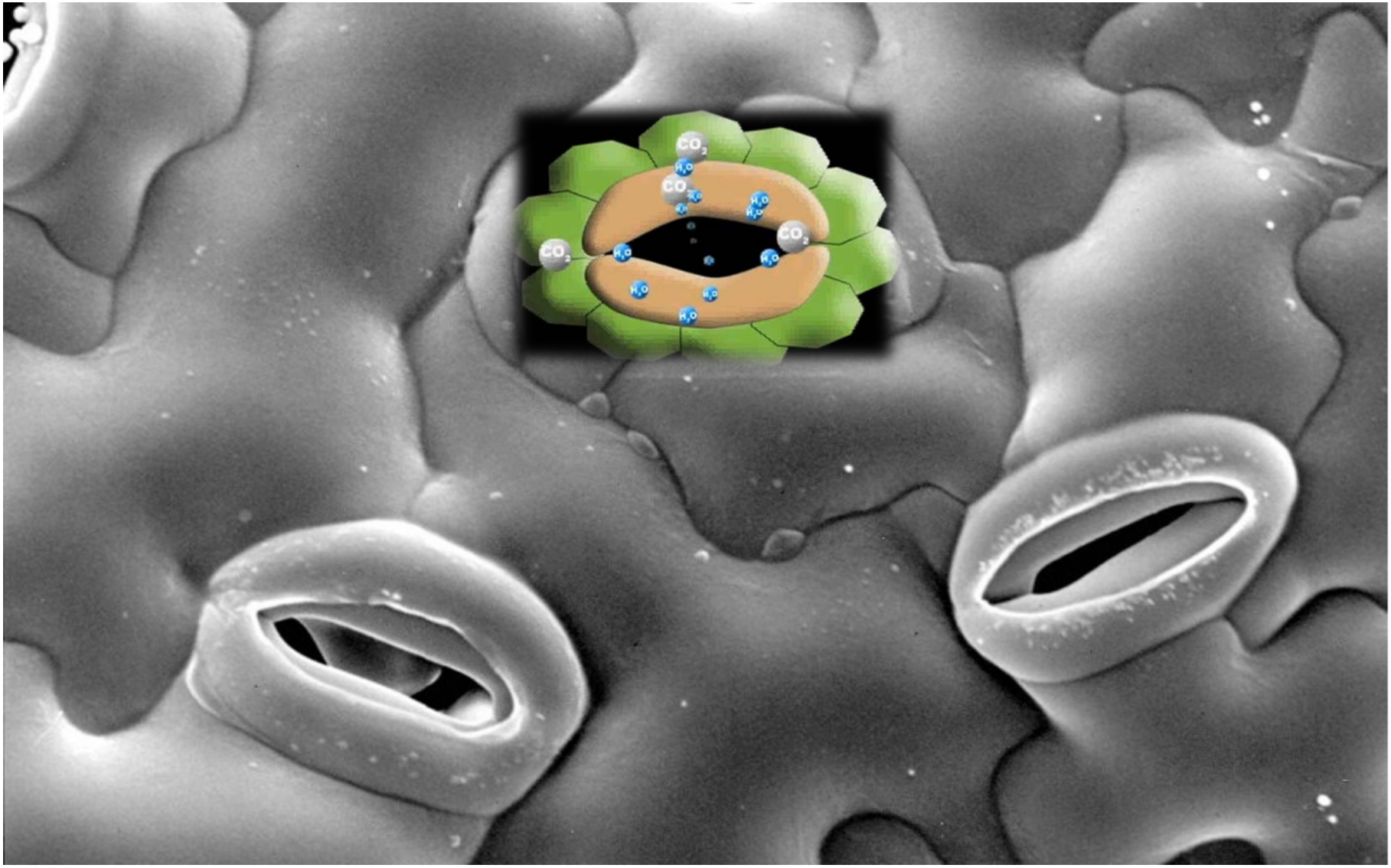
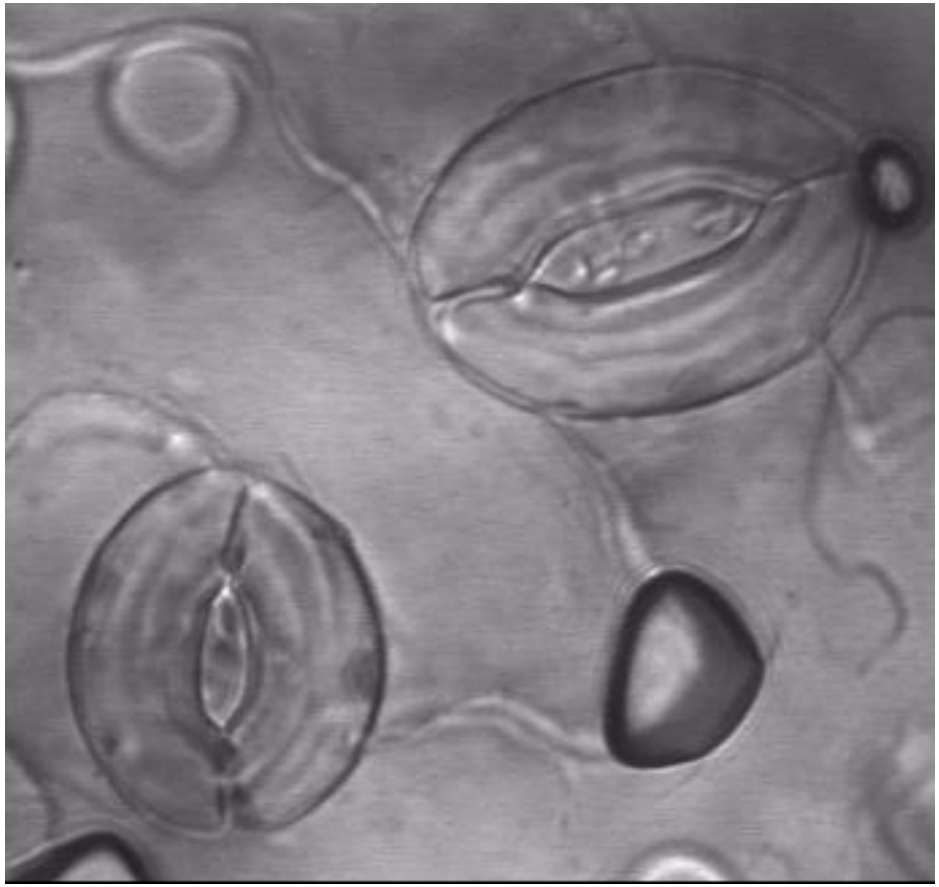
ICBR
25 YEARS OF ADVANCING SCIENCE

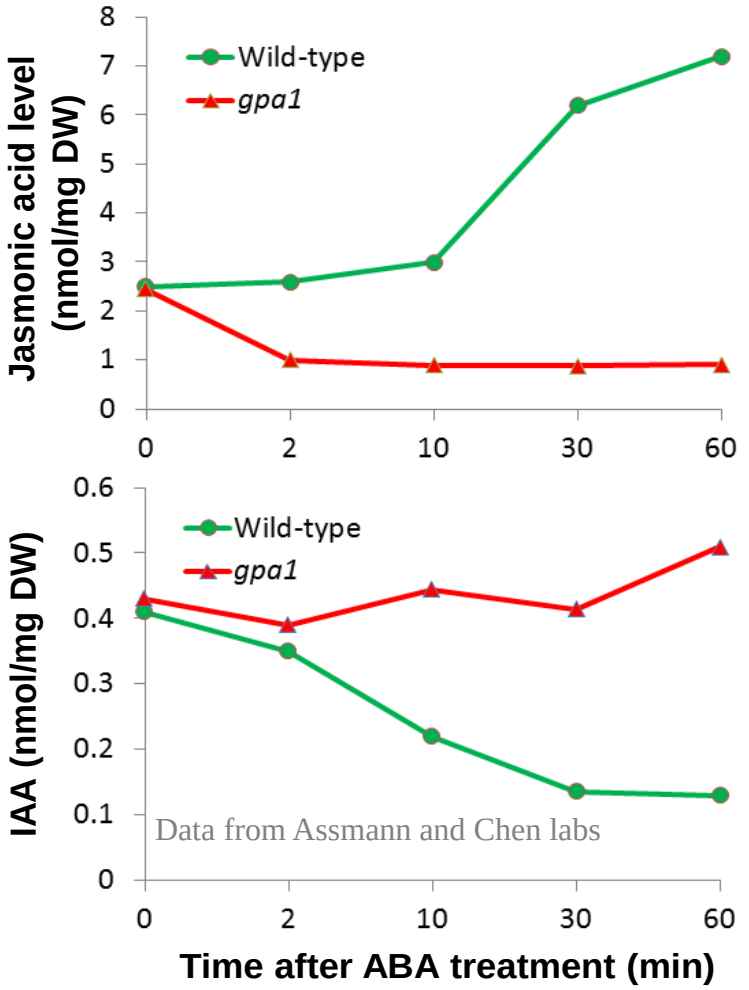
My area of research: proteomics and metabolomics of stomatal movement



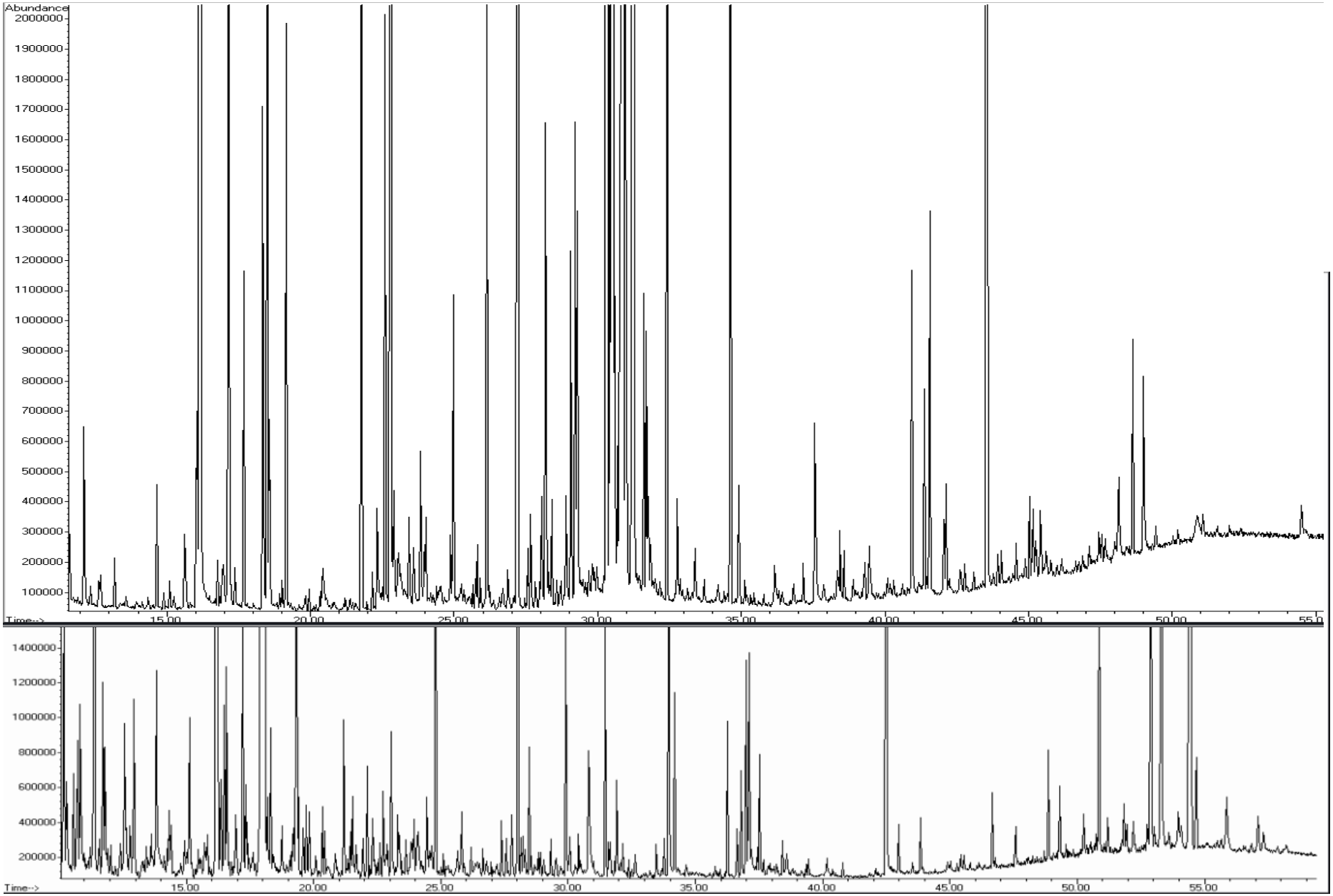
“Omics” and systems approaches

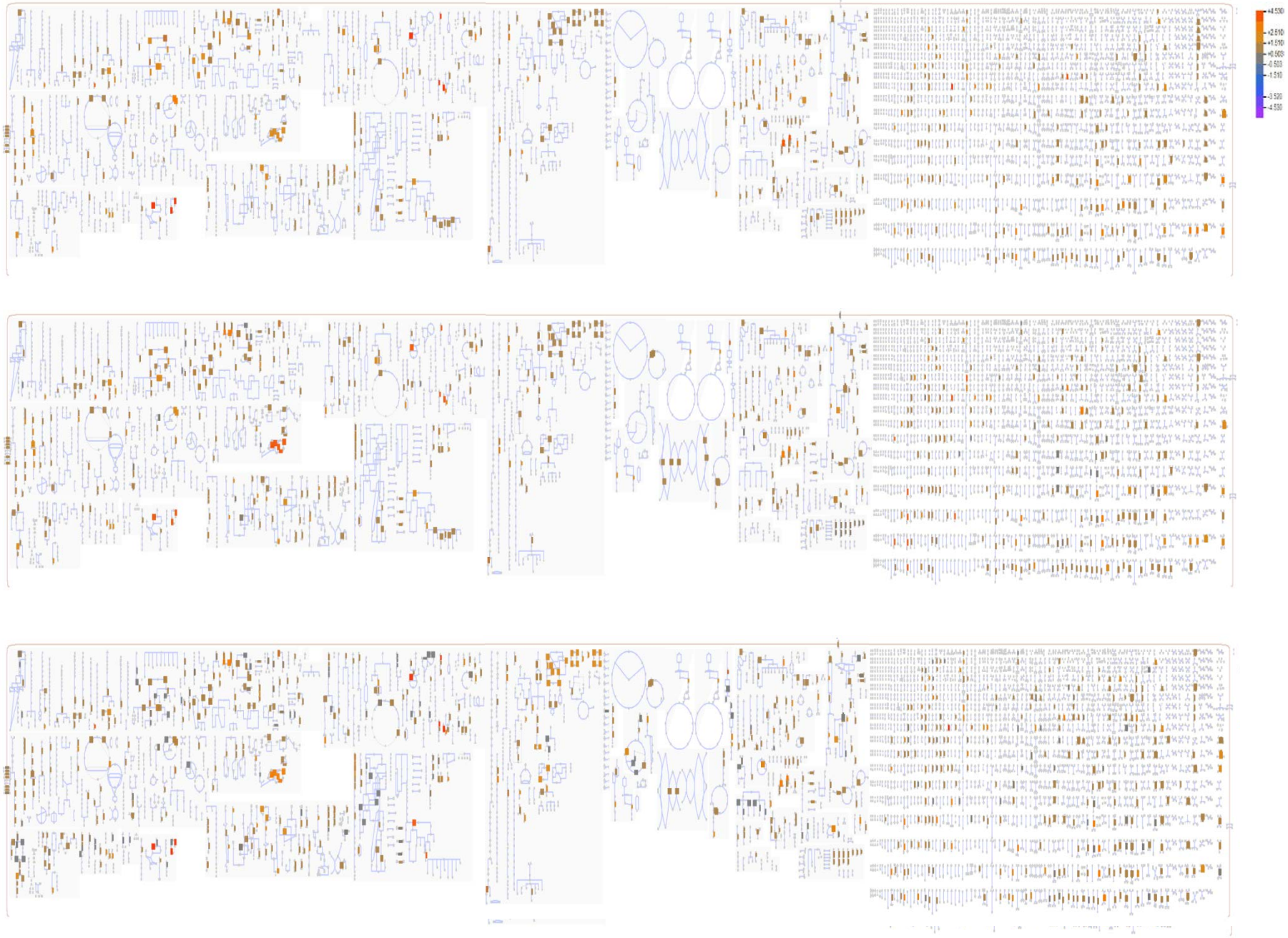
• Environmental and genetic perturbation of stomatal movement, follow how the cells’ physiology is changing in real time and correlate with accompanying protein and metabolite changes.



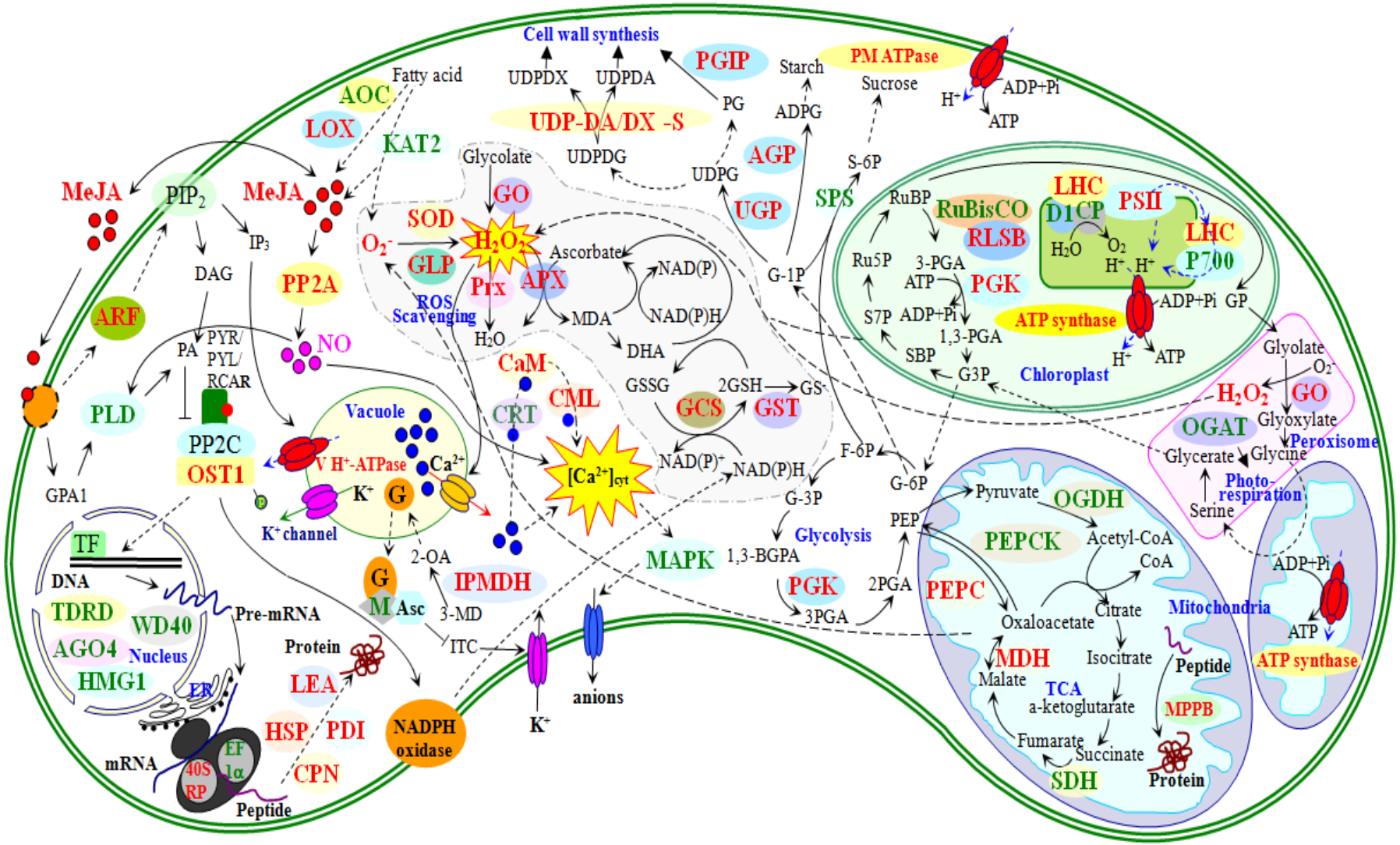


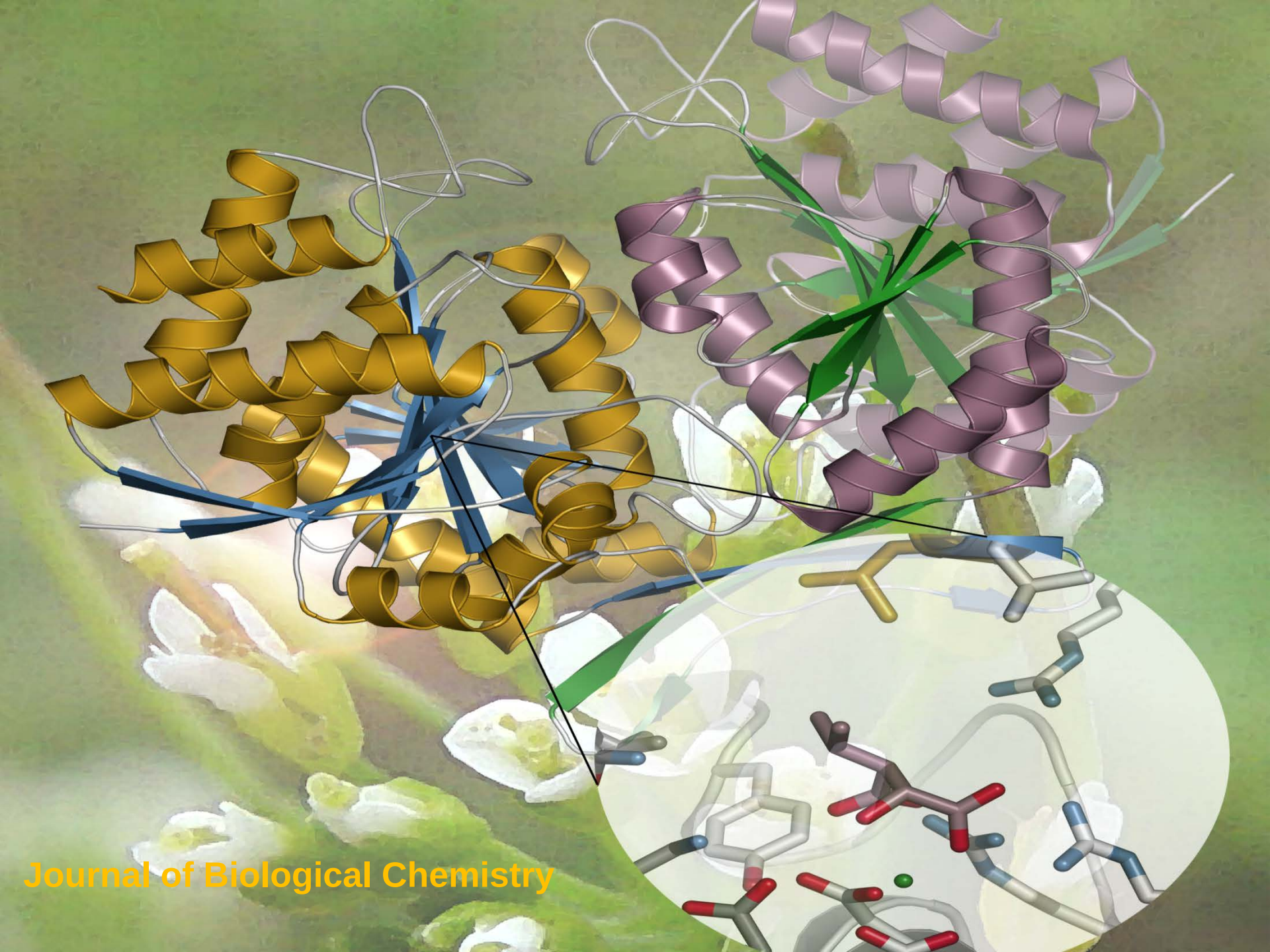
Big data generation and analysis





Systemic understanding of molecular networks




Journal of Biological Chemistry

Factors limiting big data

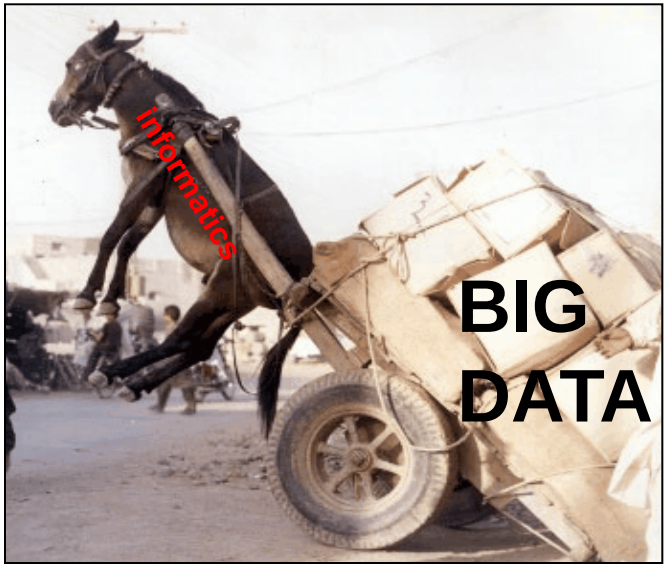
- Proteomics data generation: instrumentation and technology for high sensitivity, selectivity and throughput.
  - hypothesis generation to testing
  - scale, speed and coverage

- Proteomics data storage and archiving, quality control, release and access, Trans-Proteomic Pipeline

- Informatics: statistical/bioinformatic anlysis, networking and modeling.

- Data standard and sharing

- Training of young scientists



Current state and future perspectives

- Instrument and technology development and data generation continues to be in the active phase
- Cloud storage, back up and archiving, as well as large scale data analysis
- Open source, software interface development for non-bioinformaticians – statistics, modeling and networking
- Proteomics standard (MIAPE) and data sharing: reusing
- Cross-disciplinary collaboration and training, e.g., analytical chemistry, molecular biology, biochemistry, statistics and bioinformatics
- Big data, big challenges and big opportunities