



# **THE BRAIN IMAGING CENTRE**

**Jagiellonian University**

**Neuro-BioImaging Poland**

**Warsaw, 30.05.2011**

# THE BRAIN IMAGING CENTRE (BIC):

- Laboratories for Basic Research on Attention and Emotion:
  - Malopolska Centre for Biotechnology, Department of Neurobiology, fMRI Laboratory (coordinator)
  - Institute of Psychology
  - Institute of Applied Psychology
- Laboratories for Clinical Research:
  - Chair of Radiology, Medical College, Cracow
  - Chair of Neurology, Medical College, Cracow
- Laboratories on Cognitive Aging and Psychopathology:
  - Warsaw School of Social Sciences and Humanities, Warsaw Interdisciplinary Centre for Applied Cognitive Studies



# Laboratories for Basic Research

## DENSE ARRAY EEG LAB

Current, located at Institute of Applied Psychology, JU

- 256 channels EEG
- GPS system
- Analysis Software Tools
  - E-Prime
  - Net Station
  - BESA & Brain Voyager



# Laboratories for Basic Research

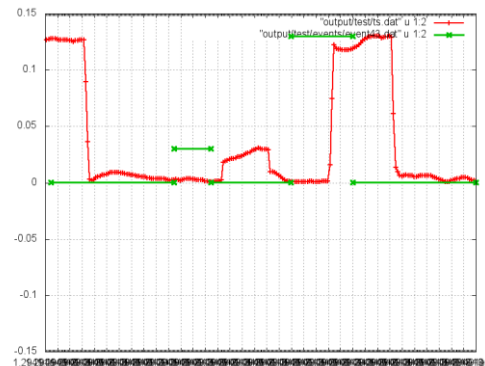
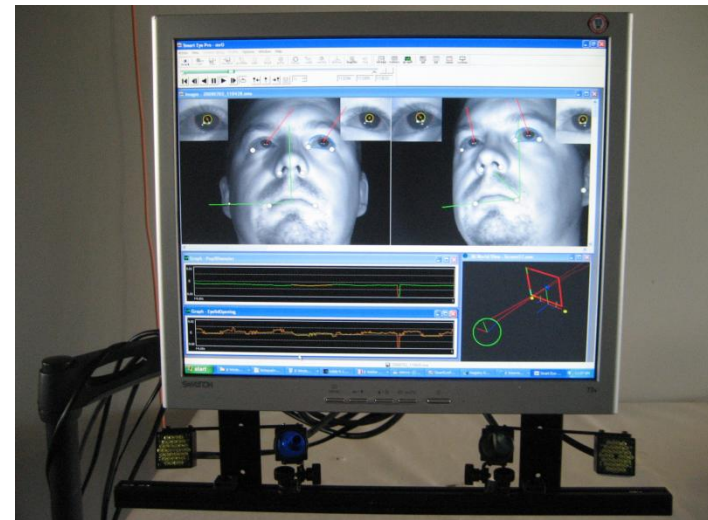
## SMART EYE SYSTEM

Current, located at Institute of Applied Psychology, JU

- Integrated with EEG System

Capabilities:

- Eye-tracking
- Gaze tracking
- Pupil diameter
- Blink & saccade detection



# Laboratories for Basic Research

## 3T MRI SYSTEM + NORDIC NEUROLAB

Planned (2012) - Department of Neurobiology,  
Malopolska Centre for Biotechnology

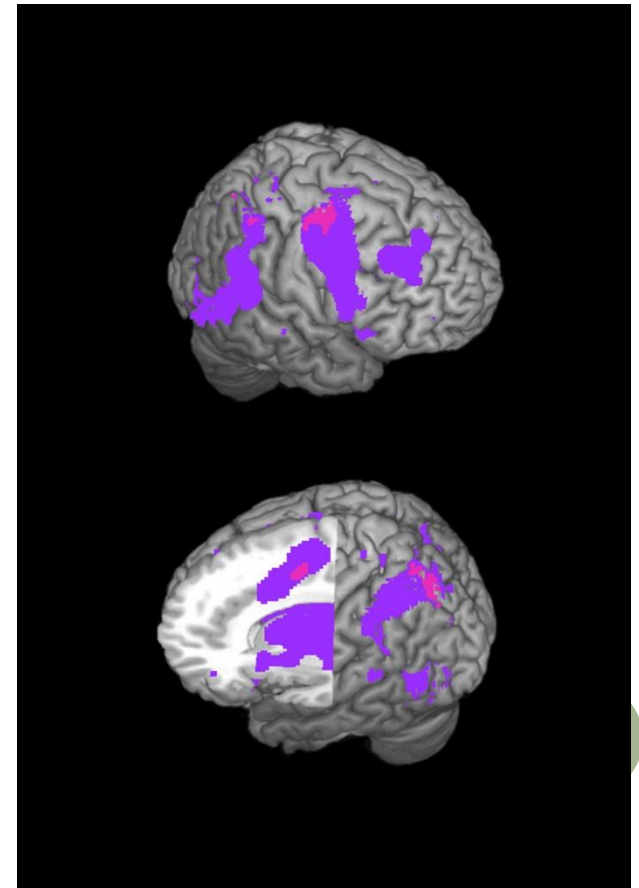
Dedicated for research only

3T MRI System capabilities:

- Functional MRI
- Spectroscopy
- Tractography

Nordic Neuro Lab

- Visual System
- Audio System
- Response Grip



# RESEARCH FOCUS AND SCOPE

## LABORATORIES FOR BASIC RESEARCH ON ATTENTION AND EMOTION

Department of Neurobiology, MCB, JU

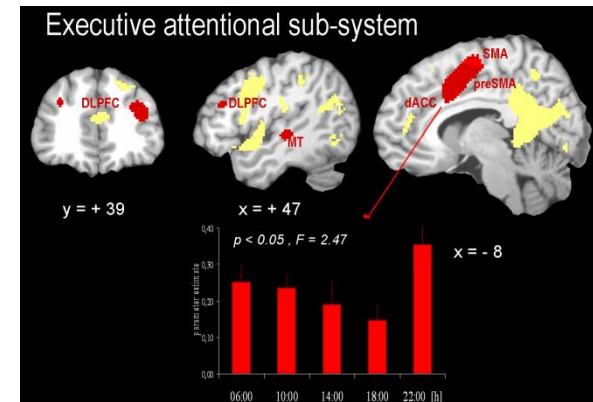
Institute of Applied Psychology, JU

Functional neuroimaging studies of human brain

- Attention, Memory and Emotions
- Executive System, Default Mode Network
- Error detection and error correction neural systems
- Chronic sleep deficit and diurnal variability – pattern of neural systems activity

Selected recent publications:

- Marek, T., Fafrowicz, M., Golonka, K., Mojsa-Kaja, J., Oginska, H., Tucholska, K., Urbanik, A., Beldzik, E., Domagalik, A. (2010). **Diurnal patterns of activity of the orienting and executive attention neuronal networks in subjects performing a Stroop-like task: an fMRI study.** *Chronobiology International, The Journal of Biological and Medical Rhythm Research*,
- Fafrowicz, M., Oginska, H., Mojsa-Kaja, J., Marek T., Golonka, K., Tucholska K. (2010). **Chronic sleep deficit and performance of a sustained attention task – an EOG study.** *Chronobiology International, The Journal of Biological and Medical Rhythm Research*
- Oginska, H., Fafrowicz, M., Golonka, K., Marek T., Mojsa-Kaja, J., Tucholska K. (2010). **Chronotype, sleep loss, and diurnal pattern of salivary cortisol in a simulated day-long driving.** *Chronobiology International, The Journal of Biological and Medical Rhythm Research*



# Laboratories for Basic Research

## Cooperator

### Institute of Pharmacology, Polish Academy of Science, Cracow

- Research focus and scope:
  - Anxiety control, PTSD, depression
  - Gene expression
  - Effects of drugs

#### Selected recent publications:

- Attwood BK, Bourgognon JM, Patel S, Mucha M, Schiavon E, Skrzypiec AE, Young KW, Shiosaka S, Korostynski M, Piechota M, Przewlocki R, Pawlak R. **Neuropsin cleaves EphB2 in the amygdala to control anxiety.** *Nature*, 2011
- Solecki W, Ziolkowska B, Krowka T, Gieryk A, Filip M, Przewlocki R. **Alterations of prodynorphin gene expression in the rat mesocorticolimbic system during heroin self-administration.** *Brain Res.* 2009
- Solecki W, Turek A, Kubik J, Przewlocki R. **Motivational effects of opiates in conditioned place preference and aversion paradigm—a study in three inbred strains of mice.** *Psychopharmacology*, 2009

### Institute of Psychology, JU, Cracow

- Research focus and scope:
  - Memory functions
  - Emotions

#### Selected recent publications:

- Qin S, Rijpkema M, Tendolkar I, Piekema C, Hermans EJ, Binder M, et al. **Dissecting medial temporal lobe contributions to item and associative memory formation.** *NeuroImage*, 2009



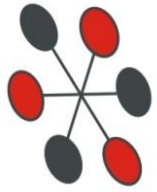
# LABORATORIES FOR CLINICAL RESEARCH

Chair of Radiology and Chair of Neurology, Medical College, JU, Cracow

- Current equipment:
  - 1.5T MRI GE Signa Excite scanner,
  - genetic analysis laboratory
  
- Research focus and scope:
  - Stroke
  - Gene expression
  - Gender
  - Degenerative disorders of neuronal system
  
- Selected recent publications:
  - Pera J, Korostynski M, Krzyszkowski T, Czopek J, Slowik A, Dziedzic T, Piechota M, Stachura K, Moskala K, Przewlocki R, Szczudlik A. **Gene expression profiles in human ruptured and unruptured intracranial aneurysms: what is the role of inflammation?** *Stroke* 2009
  - Turaj W, Slowik A, Wnuk M, Szczudlik A. **Gender-related differences in diagnostic evaluation and outcome of ischemic stroke in Poland.** *Stroke*. 2009
  - Klimkowicz-Mrowiec A, Furgal M, Slowik A, Szczudlik A., **Reversible limbic encephalitis in a person with Alzheimer's disease.** *J Am Geriatr Soc*. 2011







**ICACS** Interdisciplinary Center  
for Applied Cognitive Studies

ul. Chodakowska 19/31, 03-815 Warszawa tel./fax.: (+48) 022 517 98 24 www.icacs.swps.edu.pl



Warsaw School  
of Social Sciences and Humanities

www.swps.pl

## Laboratories on Cognitive Aging and Psychopathology

**Staff:** Professor Grzegorz Sędek, 4 Assistant Professors (dr Aneta Brzezicka, dr Izabela Krejtz, dr Kinga Piber-Dąbrowska, dr Szymon Wichary), 11 PhD Students

Research in ***cognitive aging*** links the aging research to basic (e.g., attention, memory) and complex cognitive processes (e.g., reasoning)

Research in ***cognitive psychopathology*** examines emotional, mental and brain disorders in terms of the underlying basic cognitive mechanisms that are affected in these states (depression, intellectual helplessness, ADHD, PTSD)

Research in ***social cognition*** aims to identify the cognitive mechanisms of social processes (stereotypes, prejudice, stereotype threat)

**Methods:** computerized experimental studies, Eyetracking (Eyelink 2K), EEG (64 – channels EGI), fMRI (in cooperation with Medical University of Warsaw)

# Laboratories on Cognitive Aging and Psychopathology

## ICACS – SELECTED PUBLICATIONS

Special Issue Call For Papers (deadline 30 June 2011):

AGING,  
NEUROPSYCHOLOGY,  
AND COGNITION

Title: ***Cognitive and Motivational Mechanisms Compensating for the Limitations in Performance on Complex Cognitive Tasks across the Adult Life-Span***

Guest Editors: **Grzegorz Sedek** (ICACS, Warsaw School of Social Sciences and Humanities)

**Paul Verhaeghen** (Georgia Institute of Technology, Atlanta, USA)

**Mike Martin** (University of Zurich, Switzerland)

### ***Integration of Behavioral and Neuroscience Methods:***

Engle, R. W., **Sedek**, G., von Hecker, U., & McIntosh, D. N. (2005) (eds.), *ognitive limitations in aging and psychopathology* (pp. 377-401). New York: **Cambridge University Press**.

### ***EEG and Reasoning:***

**Brzezicka, A.**, Kamiński, M., Kamiński, J., & Blinowska, K. (2010). Information transfer during transitive reasoning task. *Brain Topography*, 24, 1-8.

### ***Eyetracking and Depression:***

**Brzezicka, A.**, Krejtz, I., von Hecker, U., & Laubrock, J. (in press). Eye movement evidence for defocused attention in depression – a perceptual span analysis. *International Journal of Psychophysiology*.