
I ♥ OE
MENTSÜK MEG AZ
ÓBUDAI EGYETEMET!

University Research, Innovation and Service Center (EKIK)

Director: Dr. Tamás Haidegger

Vice director: Dr. Péter Galambos

Mission of the EKIK

EKIK
University Research and Innovation Center

Main goals

- Participation in high-end international R&D projects
- Managing university projects and R&D focused education
- Building a strong international network
- Publication of world class research results

Background

- Established in 2012, operational since 2013
- 17 full-time employees
- Unique robot and biotech infrastructure
- Industrial and professional background
- Strong student community
- Notable international events

Centers of EKIK

EKIK
University Research and Innovation Center

Active research centers

- Antal Bejczy Center for Intelligent Robotics
- Bio-Tech Research Center
- Physiological Controls Research Center
- SmartLab Center
- Alternative Energy Sources Research Center
- Security Research Center
- Center for Scientific Dissemination
- Electric Power Conversion Systems Research Center

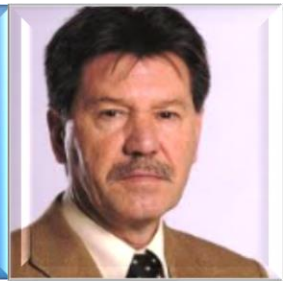
Governance of EKIK

EKIK
University Research and Innovation Center

Board of directors

Prof. Imre Rudas, chair

Prof. József Bokor



Ádám Merényi

Advisory boards of EKIK

EKIK
University Research and Innovation Center

Scientific advisors

- **Oussama Khatib – USA**
- C. L. Philip Chen – China
- Keith Heipel – Canada
- Kazuhiro Kosuge – Japan
- Ren Luo – Taiwan
- Bruno Siciliano – Italy
- Hamido Fujita – Japan
- Paolo Fiorini – Italy
- Peter Sincak – Slovakia
- Vincenzo Piuri – Italy
- Jacek M. Zurada – USA
- Huijun Gao – China
- Alin Albu-Schäffer – Germany

Advisory boards of EKIK

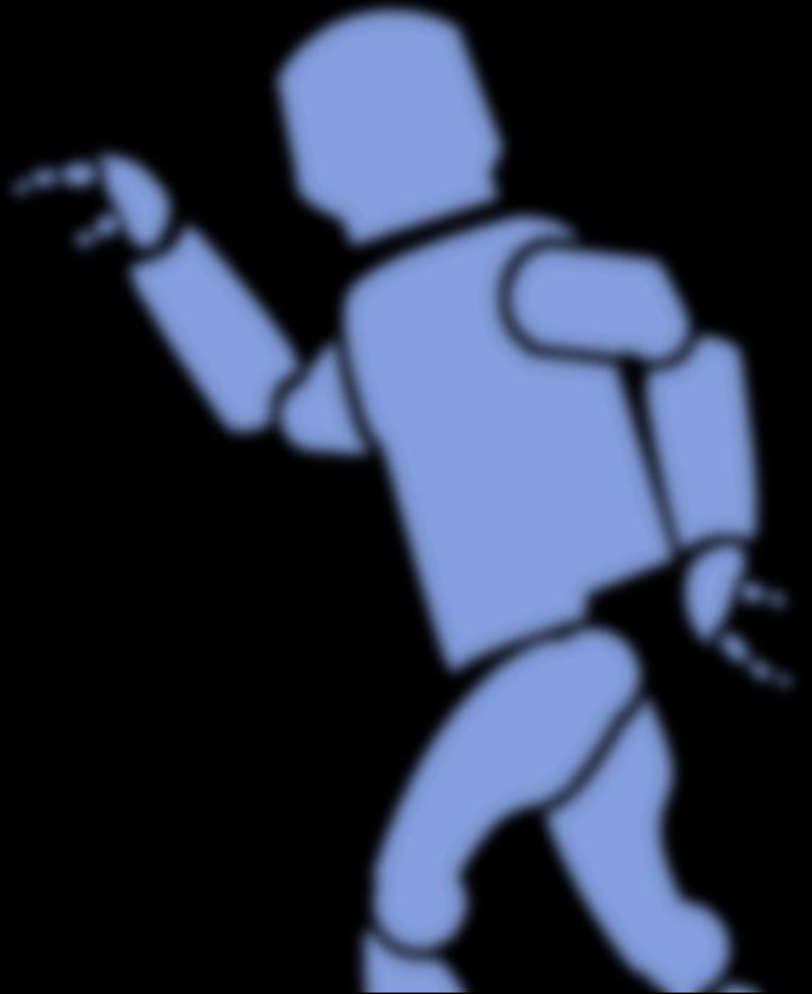
EKIK
University Research and Innovation Center

Industrial advisors

- **Gernot Kronreif – Austria**
- Thomas Strodl – Austria
- Bernd Liepert – Germany

Honorary committee

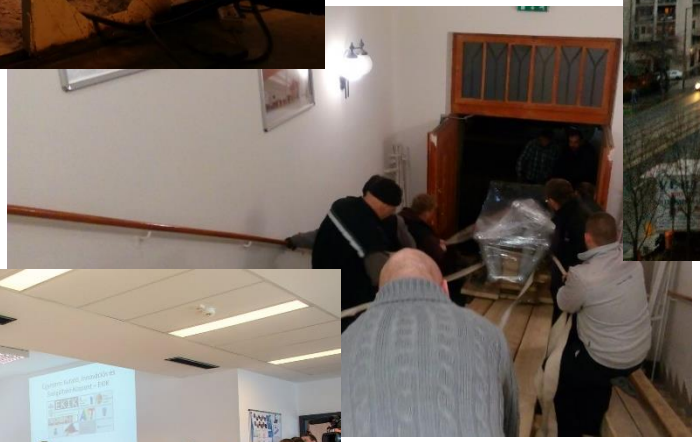
- Gerd Hirzinger – Germany
- Endre Szemerédi – USA
- Masayoshi Tomizuka – Japan

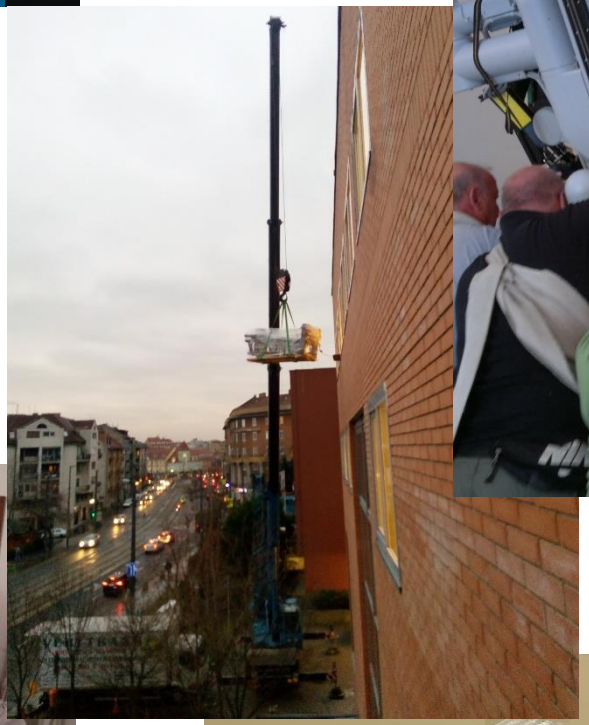


Antal Bejczy Center for Intelligent Robotics (IROB)

Director: Dr. Péter Galambos

Moving in…

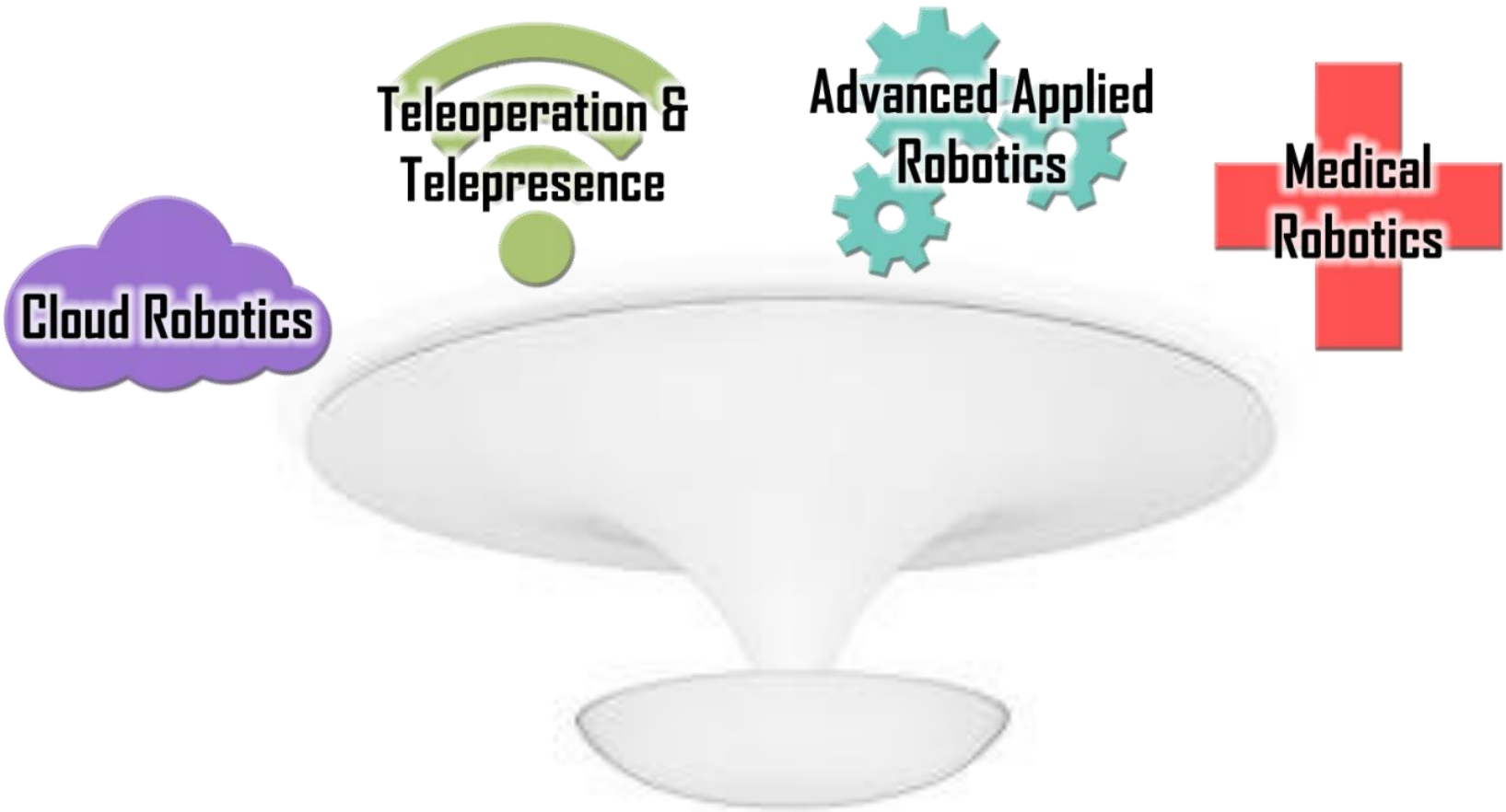




In memoriam Antal K. Bejczy

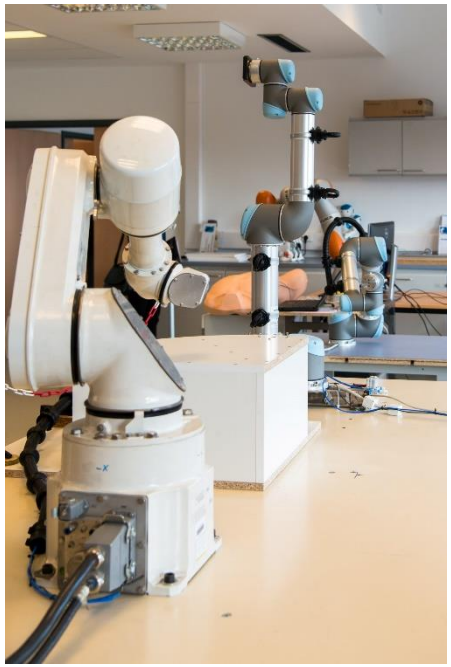
- **Senior Engineer at NASA JPL**
  - **PI of the RAMS eye surgery robot project**
- **Professor at Caltech**
- **Founder of IEEE RAS**
- **Honorary Professor of Óbuda University**

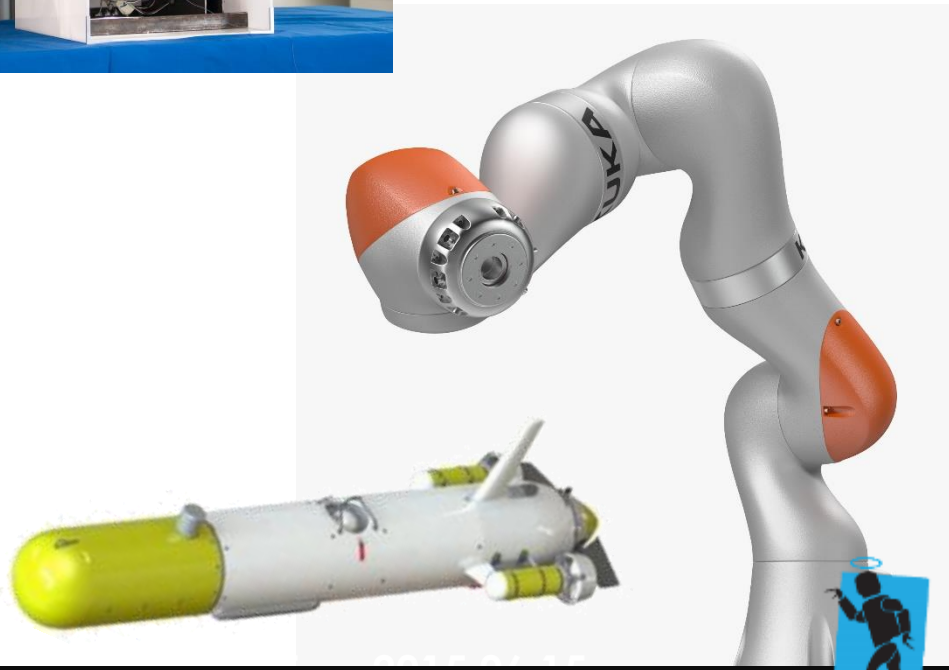
Research domains



Industrial & Medical Cyber-Physical Systems

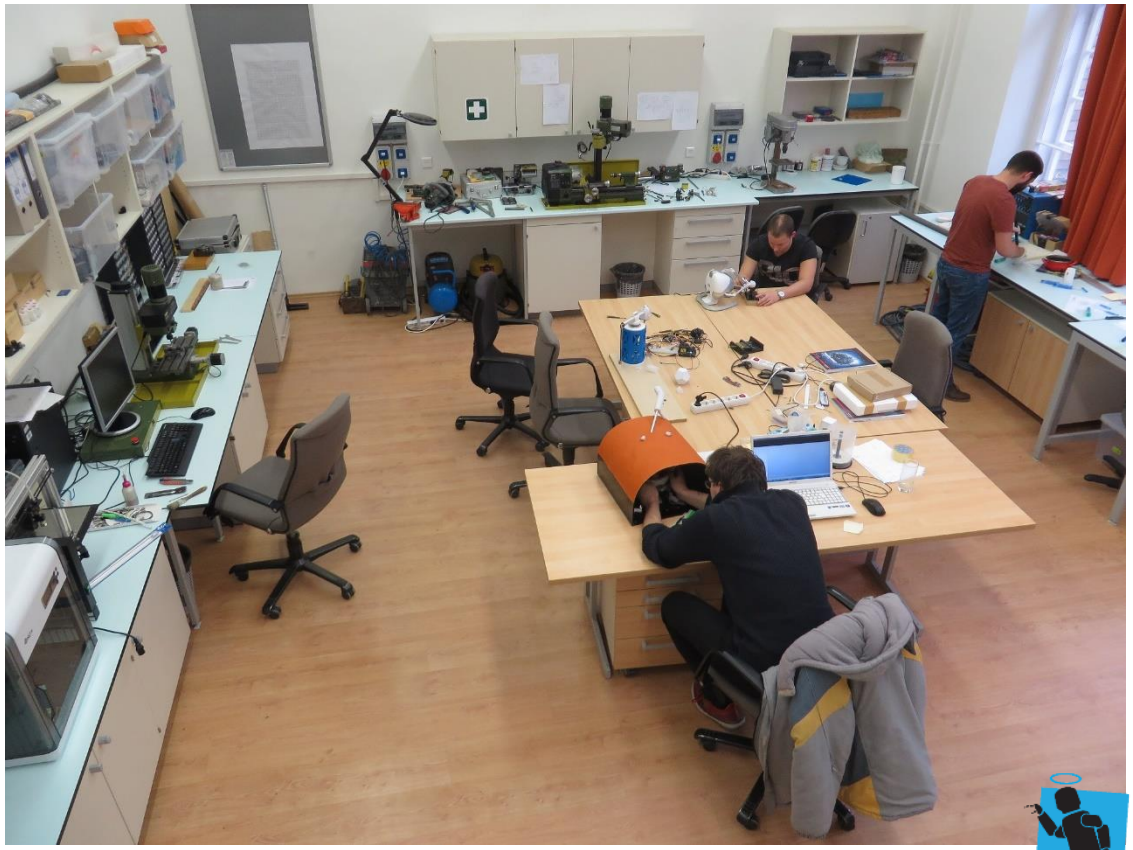
Robot infrastructure





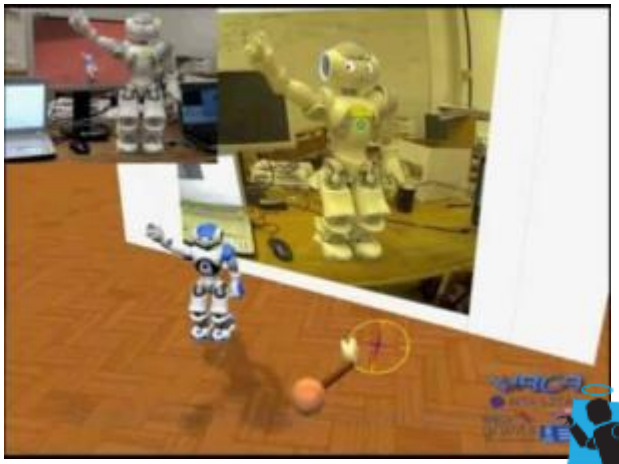
FabLab @ iROB

- **Open workshop** for all innovation-minded creators
- Great inventory of **tools and equipments**
- Metal cutting
- 3D printing
- Plastic molding
- Electronics prototyping
- Full engineering support



R&D projects

- Haptic feedback and teleoperation (KUKA YouBot)
- Human-robot interaction, social robotics (NAO robots)
- Hardware in the loop simulation of processes (Fanuc & VirCa)
- Adaptive control without model (RFPT method)
- Underwater navigation and mapping (Sparus II robot)
- Model-based surgical robotics (da Vinci Surgical System)

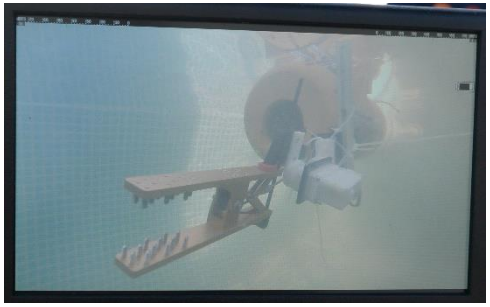


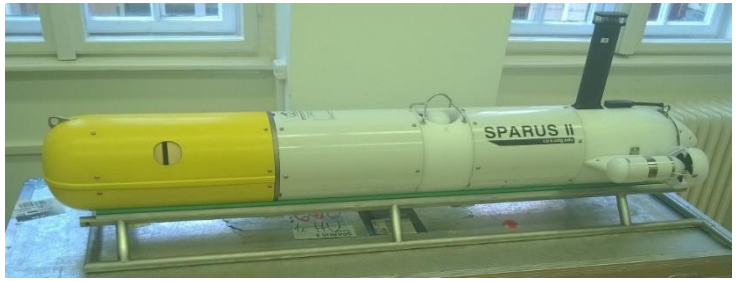
AUV for rescue mission

Taking part in the EURATHLON competition

- Robotic disaster rescue/recovery
- Land, sea, aerial challenges
  - www.eurathlon.eu/site/index.php/compete/loan

2nd place in 2017, 4th place in 2015



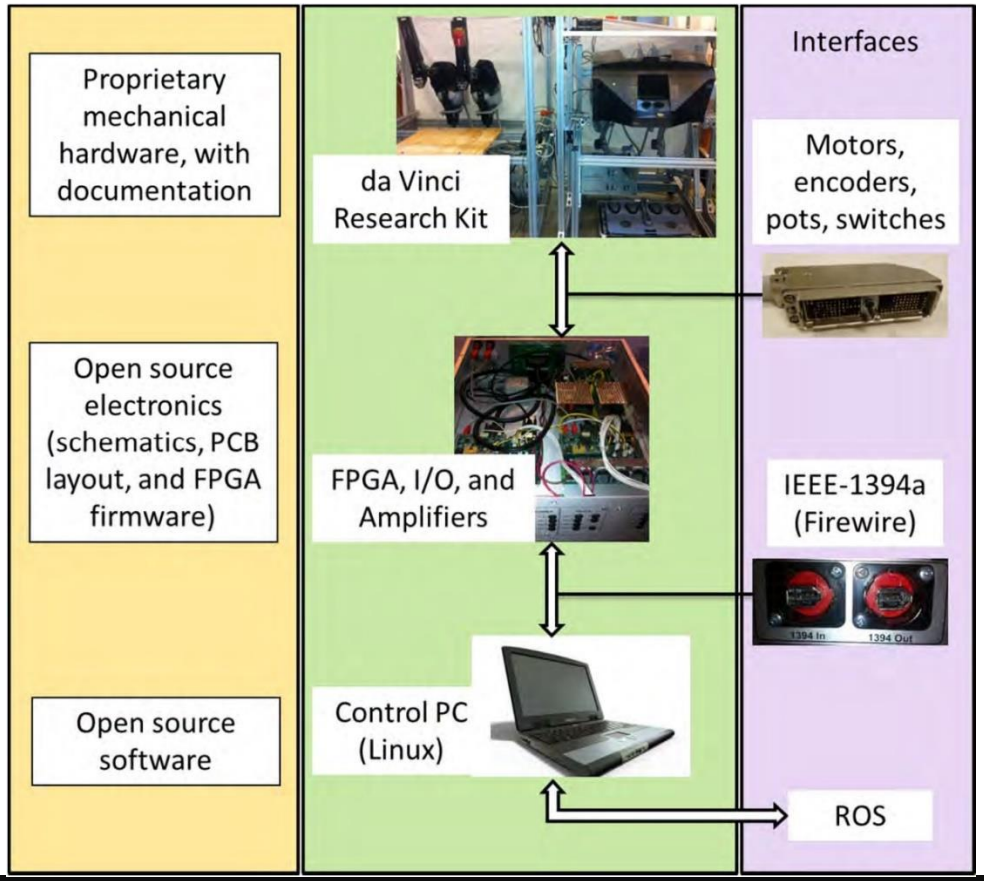


Surgical robotics at IROB

Da Vinci Surgical System Research Kit (DVRK)

Surgical Assistant Workstation (SAW)

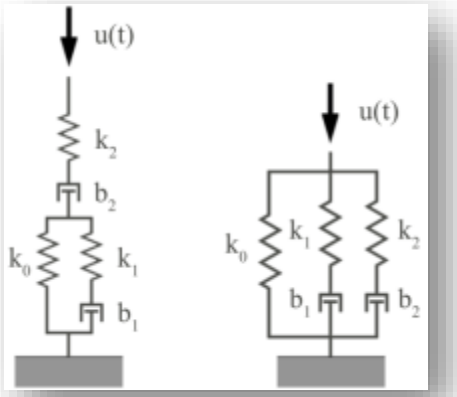
- Developed by the Johns Hopkins University and WPI
- Research was founded by the National Science Foundation (NSF)

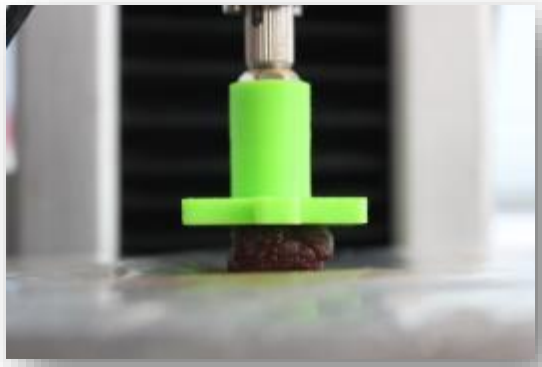


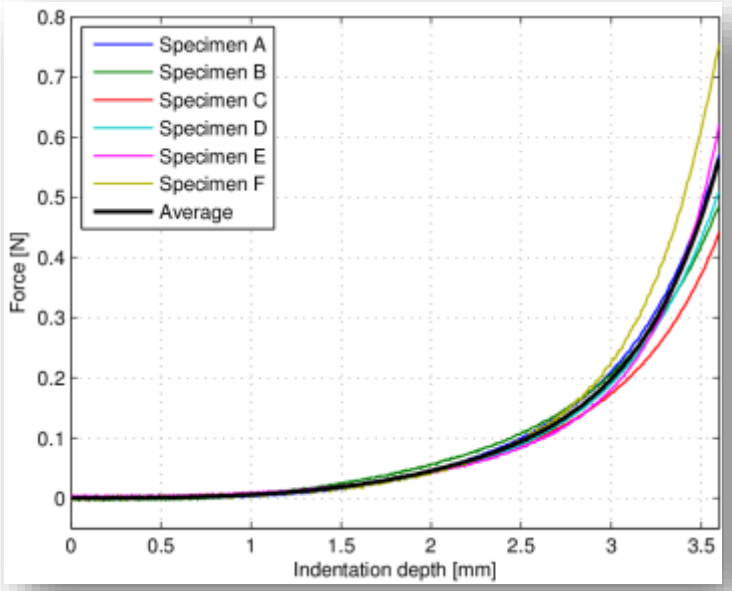
Investigation of nonlinear tissue models in robotic applications

Research tasks

- Analyzing soft tissue behavior under manipulation tasks
- Creating a mechanical model for soft tissues and tool–tissue interaction
- Model verification and parameter estimation by curve fitting
- Implementation of model-based force control for time-delayed robotic systems

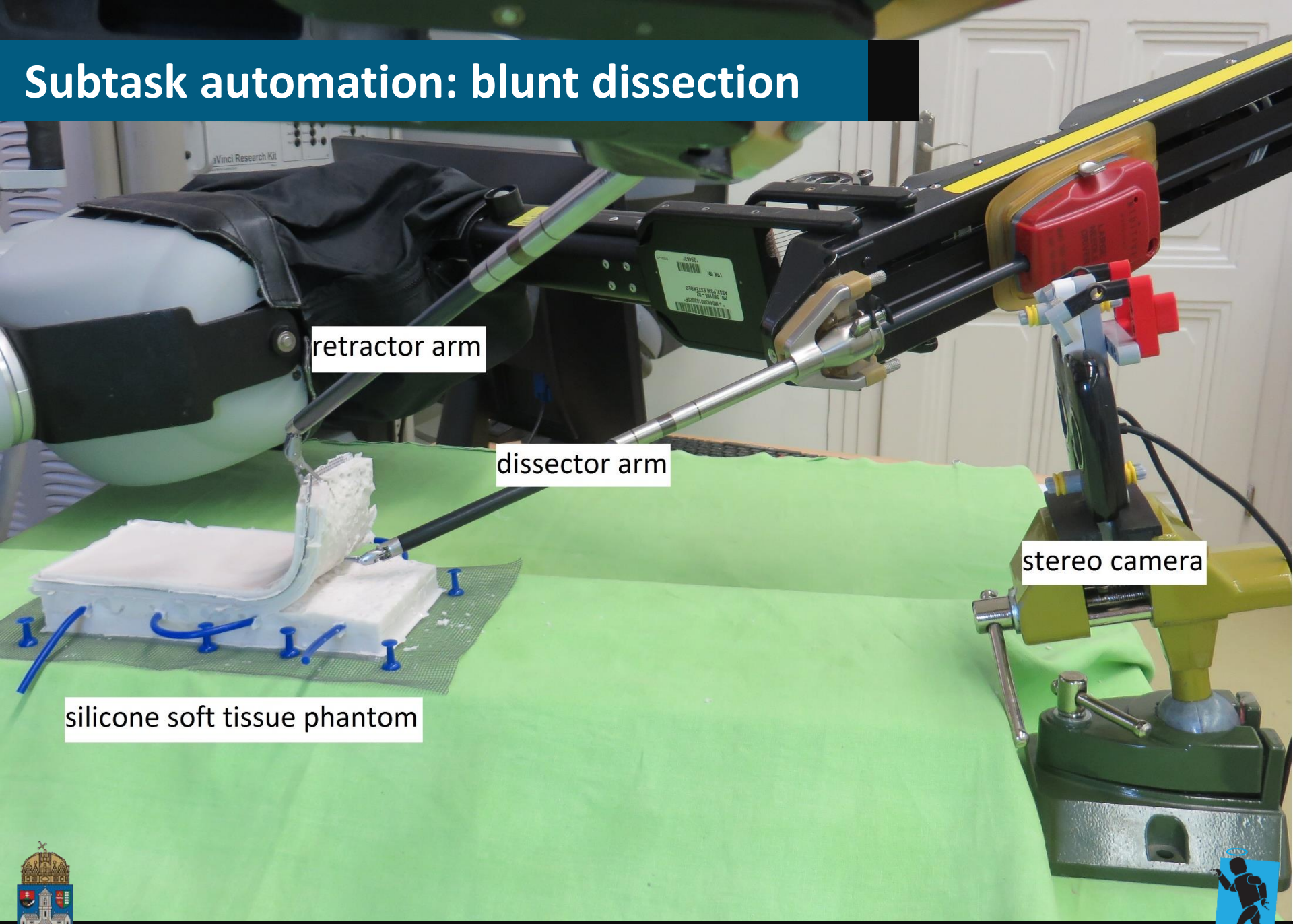




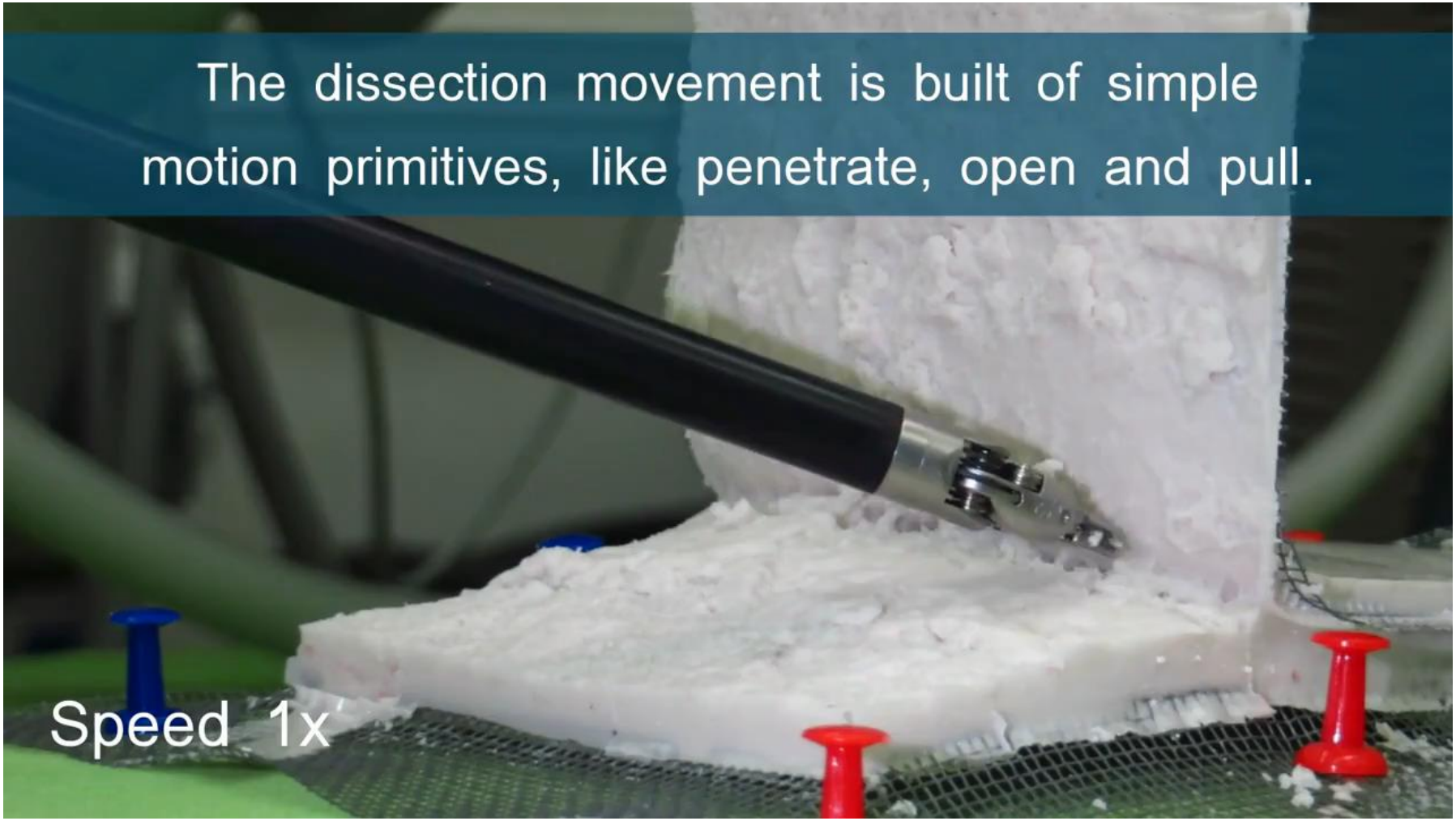


Credit: Takács et al.

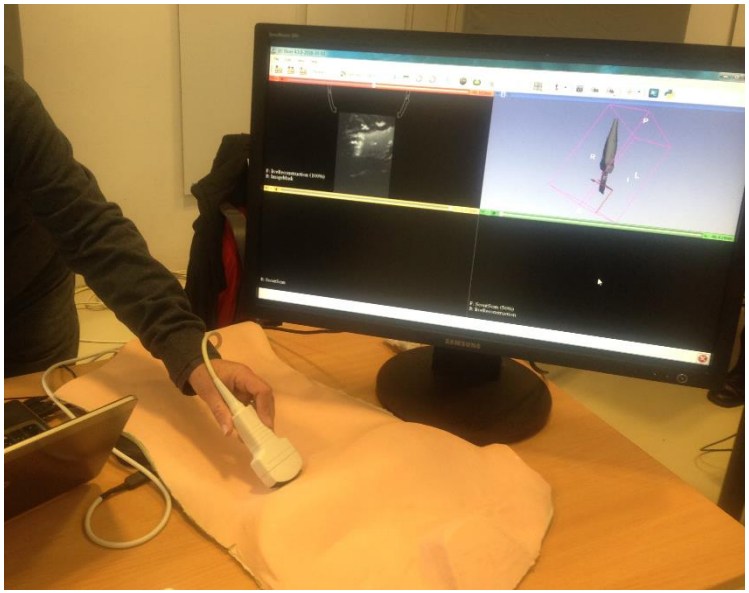
Subtask automation: blunt dissection



Video – automated blunt dissection

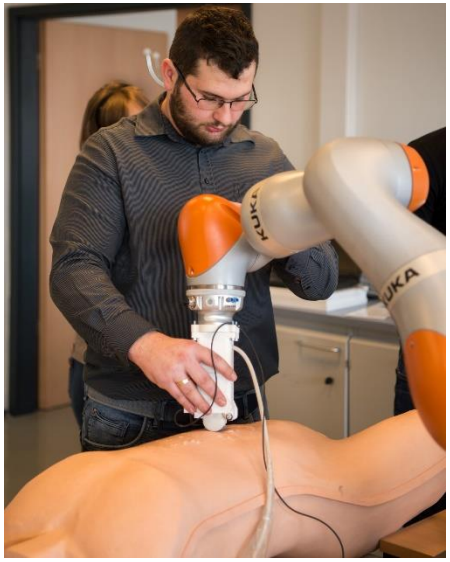


IROB approach



ROS

Open Source Robotics Foundation



dVRK

3DSlicer

Computer-Integrated Surgery R&D

Research partners

- Semmelweis University, Dept. of Surgical Research and Techniques;
- “George Berci” Surgical Training and Research Laboratory
- Military Hospital Budapest, Dept. of Urology
- Austrian Center for Medical Innovation and Technology (ACMIT)
- Johns Hopkins University, LCSR

Founders of CELLI

Central European Living Lab for Intelligent Robotics (www.cellir.eu)

Chair: Imre Rudas

- Aimed to bound together all robotics labs and companies in the CE region
- Synchronizing R&D
- Building a potent educational network
- Appling for H2020 together
- Joining euRobotics aisbl
- Initiated by TU Kosice (Peter Sincak) and ÓU
- Founded in July 2014
- 18 members
- 7 countries

International activities

IEEE RAS, SMC, IES

- AdCom memvership, VP roles
- Membership Services Committee chair
- IROS & ICRA organizing committee

- euRobotics aisbl
  - Members since 2012
  - Active in program hosting
  - Running for board positions

- Austrian Center for Medical Innovation and Technology
  - ACMIT Gmbh, Comet-1 center

Involvement in standardization

International Organization for Standardization

ISO/TC 299 JWG 9, 35, 36

- **Joint Work Group on Standard for Medical Robot Safety**
- Delegate of the Hungarian Standards Institution (MSZT)

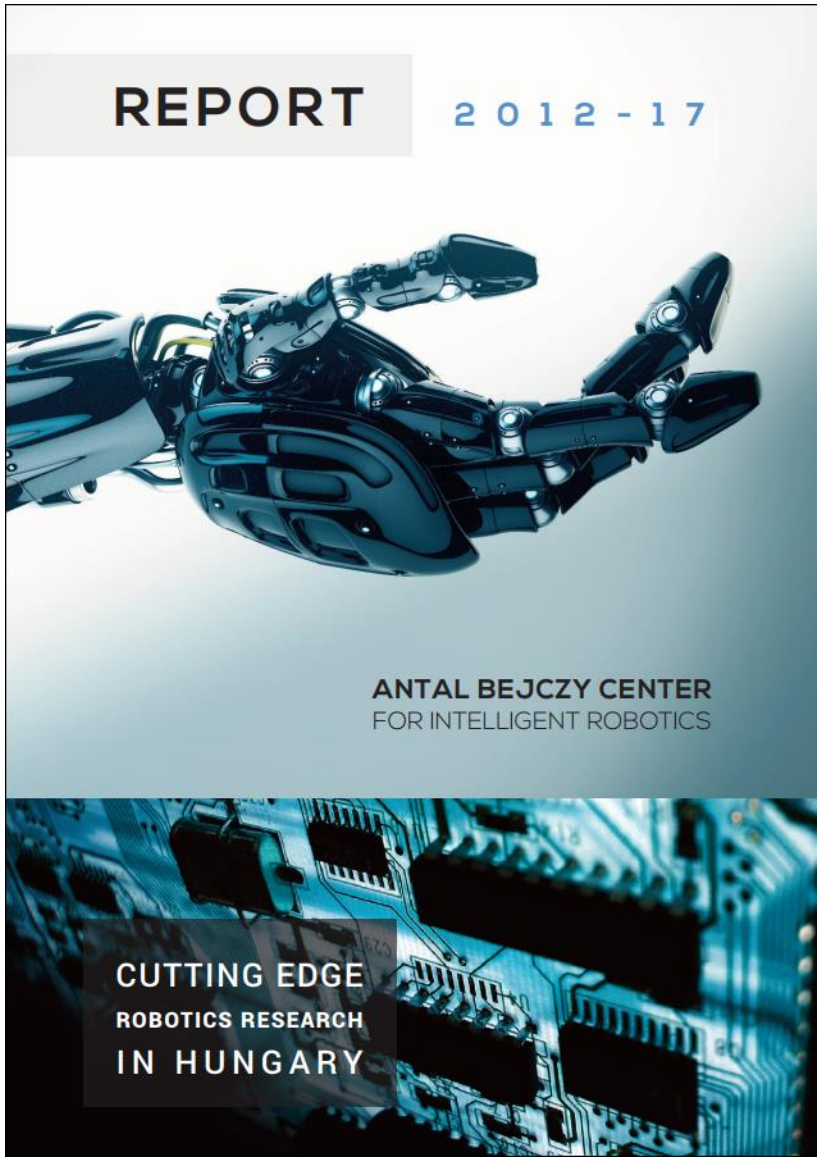
IEEE RAS standing committee for standardization

- **IEEE - 1872: Standard for Ontologies for Robotics and Automation**
- Leaders: Edson Prestes (BR), Craig I. Schlenoff (USA)

EURobotics aisbl

- Topic Group—Standardisation (Gurvinder Virk, Paolo Barattini)

IROB 5-year report



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Thank you!

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