

***ERCOFTAC Spring Festival „Panta rhei”  
Budapest University of Technology and Economics  
Budapest, Hungary, May 4th, 2009***



## **INTRODUCTION**

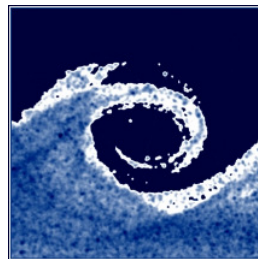
**Dr. János VAD**

**Associate professor, head of department**

**Budapest University of Technology and Economics (BME)**



**Faculty of Mechanical Engineering  
Department of Fluid Mechanics (DFM)**



# 1. Handouts on the desk

- Programme leaflet
- Abstracts booklet
- Budapest City Map
- Leaflet introducing DFM, BME + Acoustic Laboratory
- Conference on Modelling Fluid Flow CMFF'09
  - 2nd Announcement
  - Proceedings of CMFF'03, CMFF'06 (copies available)
- GÉP („Machine”)
  - Departmental Special Issue,
  - Journal of Scientific Society of Mechanical Engineers
- „panta rhei” → Catalogue on fine arts exhibition „Flow”  
hommage à Gruber József
- Bags (optional)

## 2. CMFF'09

- 9 to 12 September 2009, BME
- More than 160 abstracts from more than 30 countries
- Invitation to participate

- **Keynote speeches**

*Dr. F. Menter, Otterfing (D):*

**"Trends and Challenges in Modelling Complex Turbulent Flows"**

*Dr. D. Van Zante, Cleveland (USA):*

**"Large-Scale Simulations for Turbine Engine Core Noise"**

*Prof. B. E. Launder, Manchester (GB):*

**"Osborne Reynolds - the Turbulent Years"**

## **Workshops**

**Codes, Standards and Legislation Impacting on the Fan Industry**

**Dr. G. A. Sheard, Colchester (GB); Dr. A. Corsini, Rome (I)**

**Challenges in Modelling Biomedical Flows**

**Prof. D. Thevenin, Magdeburg (D); Dr. G. Janiga, Magdeburg (D)**

**POD, SVD, Data Analysis and Model Reduction**

**Prof. L. Cordier, Poitiers (F); Dr. T. Régert, Budapest (H)**

**Recent Advances on Modelling of Turbomachinery Aero- and Thermodyn.**

**Dr. F. Rispoli, Rome (I); Dr. A. Corsini, Rome (I)**

**Modelling of atmospheric flows**

**Dr. T. Weidinger, Budapest (H); Dr. G. Kristóf, Budapest (H)**

### **3. Industry-related departmental R&D and consultancy**

- We are more than willing to collaborate with you
  - Taking the „strict” role of a market entity
  - Strong contacts with industrial firms
  - Multilevel, complex solutions
    - Machinery – equipment – system (applications)
    - Undertaking concerted „work packs”  
(heat and fluids engineering, manufacturing, diagnostics  
(vibration), acoustics, mechanics
- Contracts
- Joining to European projects
- GÉP („Machine”) Journal – 3 years: PhD theses, publications,  
industrial R&D and consultancy projects

## **4. Coffee breaks, Lunch, Gala Dinner**

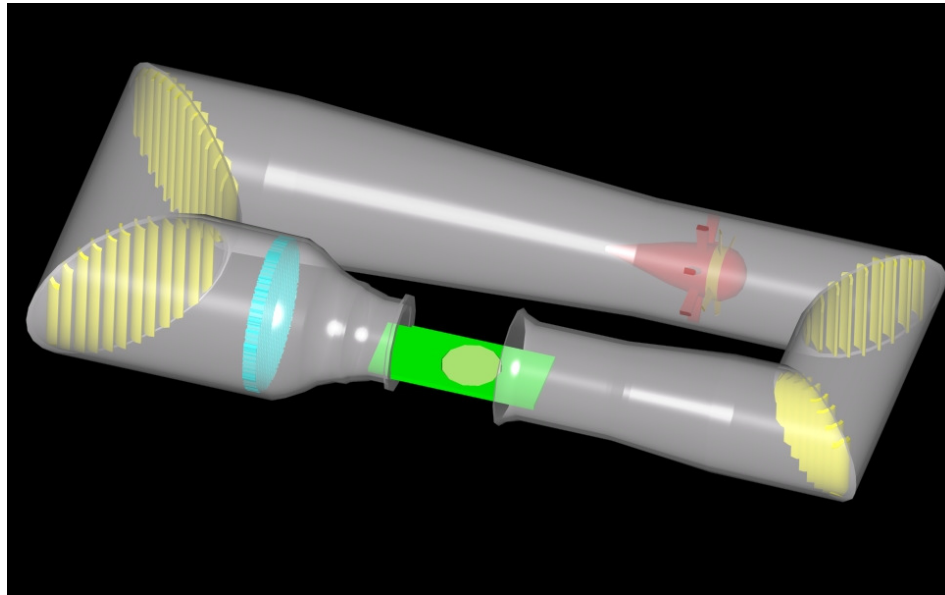
- **Coffee (am, pm), buffet lunch: both days: on the foyer in front of THIS room (Bdg. „K”, 1st Floor, Room 60)**
- **Dinner: Monday, 19.00**  
**Club of Hungarian Academy of Sciences**

**ENJOY THE BUDAPEST SPRING!**

# “Panta Rhei”: Machines in Motion – Past and Present: Department of Fluid Mechanics

**DFM** (former **Institute of Aerodynamics**): founded in 1934 to contribute as a research laboratory to the Hungarian airplane industry

## Theodore von Kármán Wind Tunnel Laboratory



*Large-scale Goettingen type  
horizontal wind tunnel*

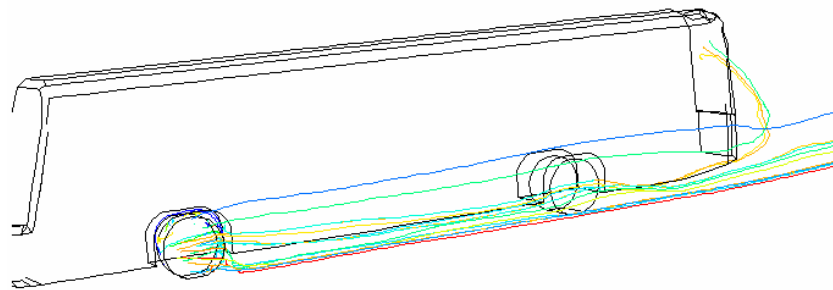
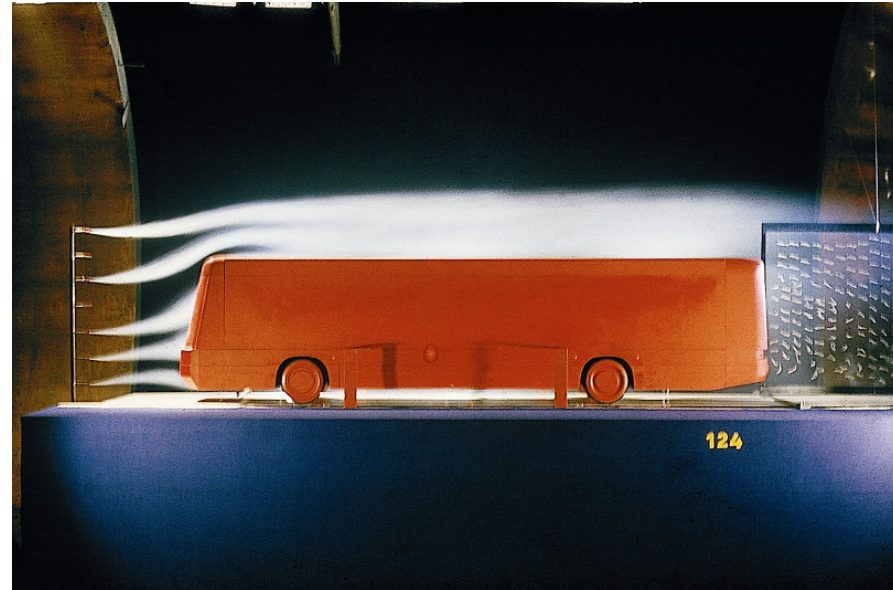


*Silver Arrow*

## Vehicle aerodynamics

Bus (IKARUS): mud deposition on the rear wall  $\Leftrightarrow$  proposal

*Past: Wind tunnel experiment  
(with moving belt)*



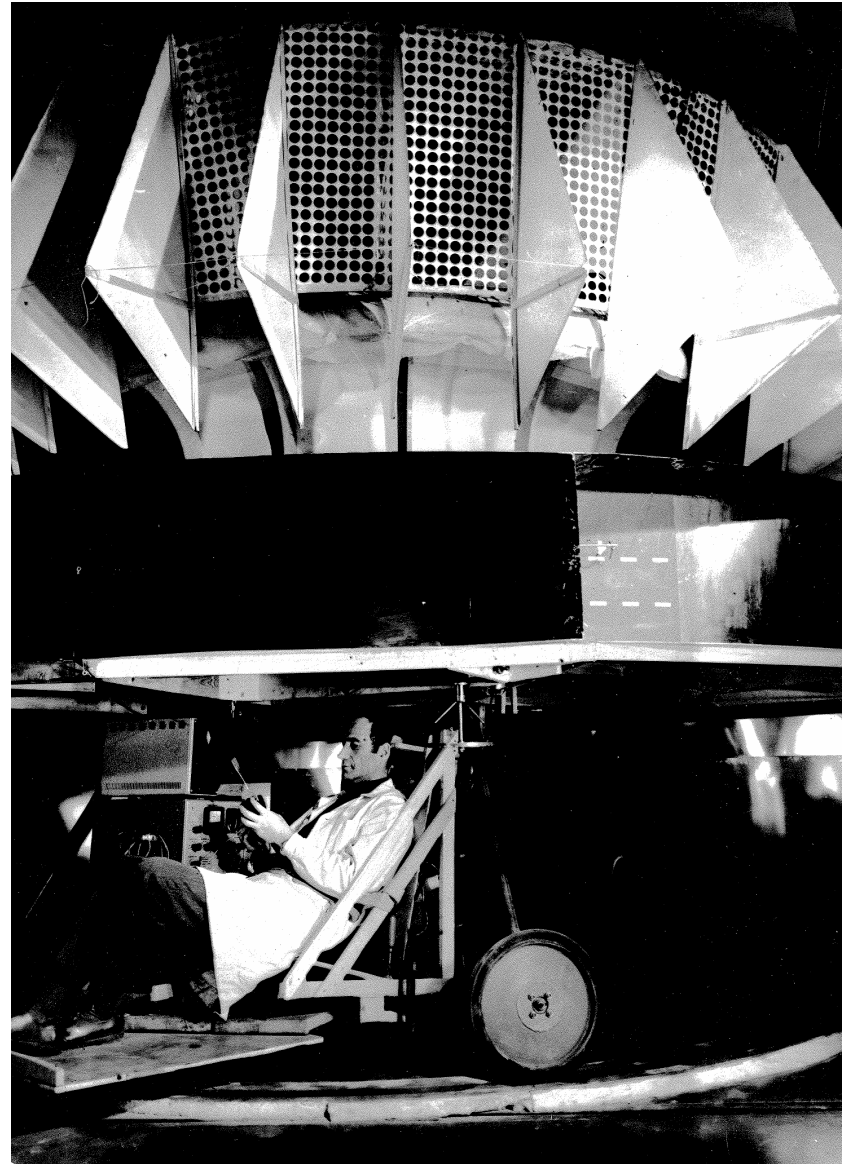
*Recent CFD simulation*



# Turbomachinery

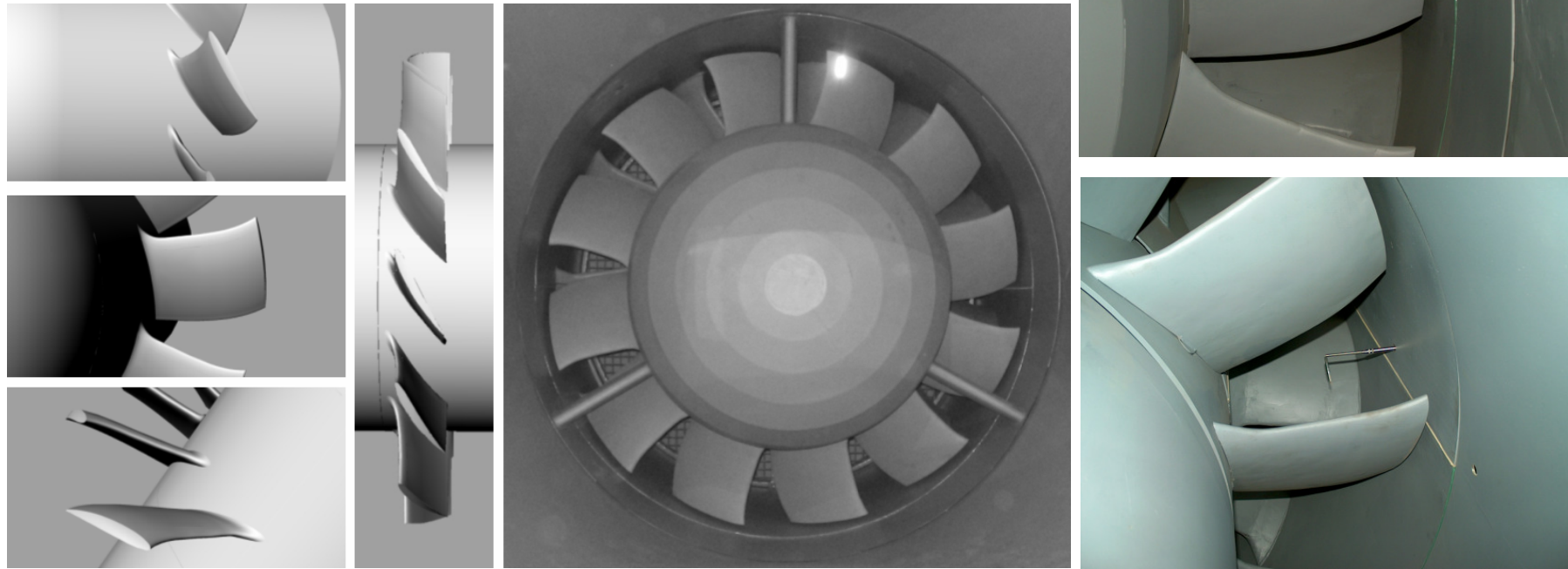
*Late 1960s:*

*Large-scale radial fan rotor  
with co-rotating measurement  
personnel*



***From 1980s:***

***High-performance industrial axial fans  
⇒ non-radial blade stacking***

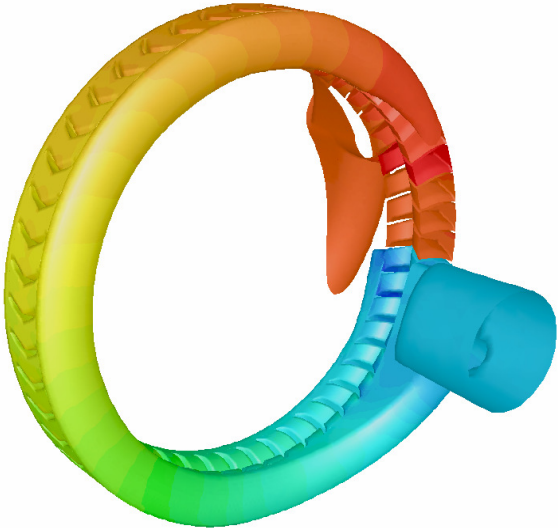


***Axial fan rotor with skewed blades***

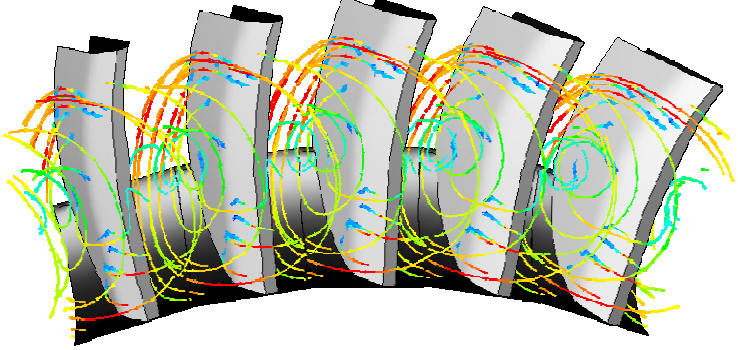
**2000s: Miniature fuel pump - simulation**



**Pressure distribution**



**Streamlines**

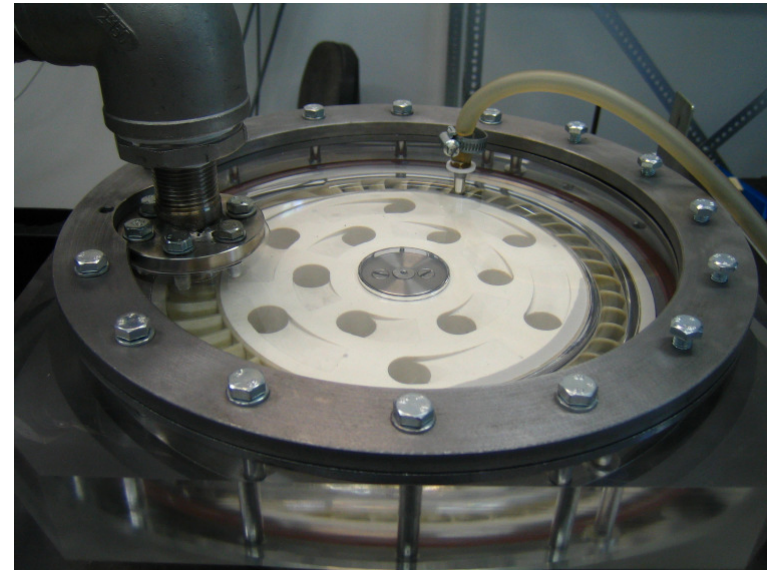


***Fuel pump - measurements***

***Project duration: 6 months, ~ 50 partner firms***



**Test rig**



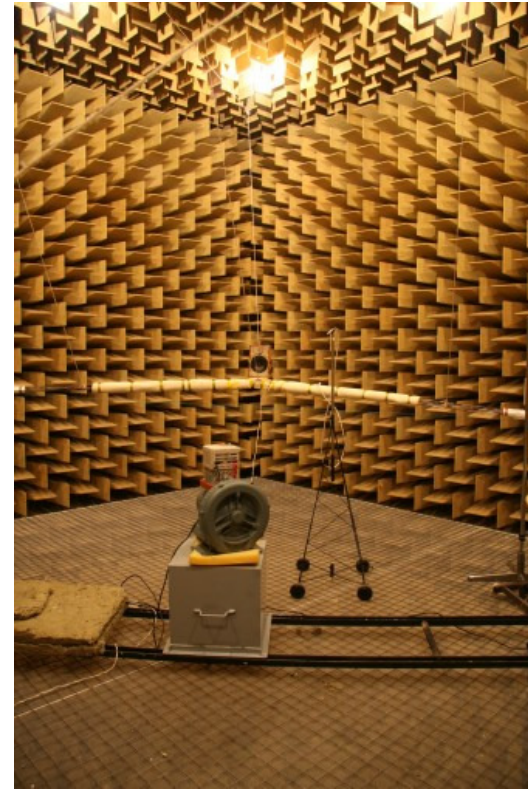
**Plexiglass model pump**

- **Laser optical flow diagnostics (LDV, PIV) applied to industrial pumps**

## ***Georg von Békésy Acoustic Laboratory***



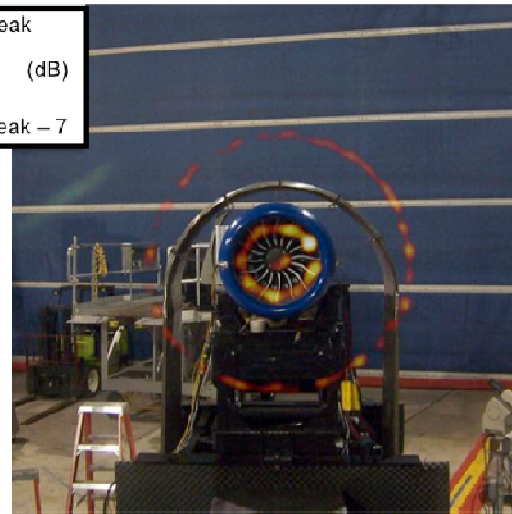
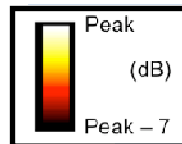
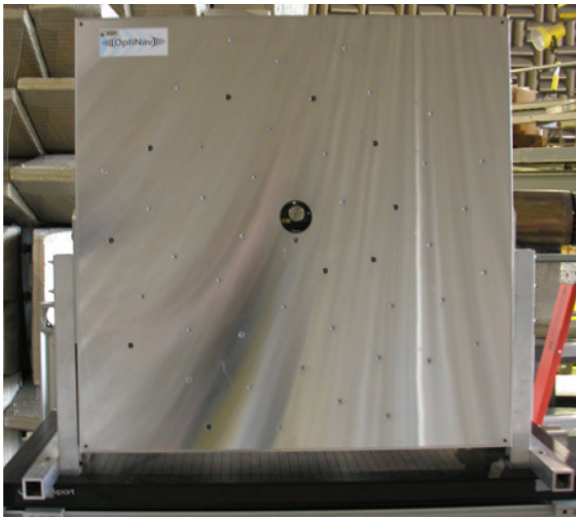
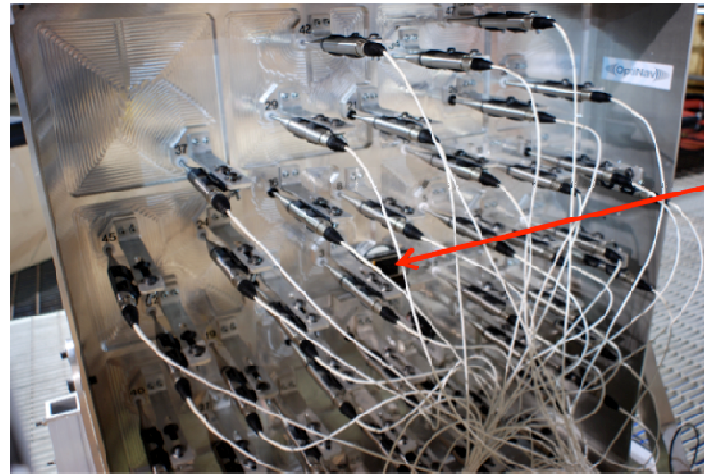
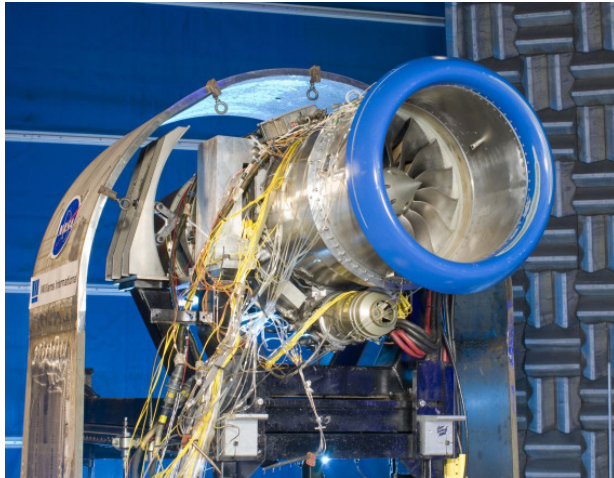
**Reverberation room**



**Anechoic room**

# Towards the Near Future

## Phased Array Microphone measurements



10.000Hz