What is the Mayo Clinic?
Mayo Clinic Foundation for Medical Education and Research

- The vision of two brothers, their father, and the Sisters of St Francis

- Mission
  - To inspire hope and contribute to health and well-being by providing the best care to every patient through integrated clinical practice, education and research.

- Primary value
  - The needs of the patient come first (“the only interest to be considered”- WH Mayo)

- Not for profit (all net revenues are reinvested in research and education, or to expand the practice)

- Salaried staff

- Physician led
- Most recognized brand in medicine
- 1.3 million patients per year (3% international)
- 4500 staff physicians
- 230 staff scientists
- $12.6 billion annual revenues ($700 million net)
- $750 million research budget
- 1800 resident physicians, 250 PhD students, 250 medical students, 1800 other students
Biomechanics Lab and Orthopedic department

Orthopedic Department
- Established in 1910
- First hip replacement in USA (1969)
- Total Joint Registry (all joint replacements at Mayo since 1969, with follow up at 5 year intervals)
- Currently with 64 faculty
  - 7 PhD scientists;
  - 32 full professors
- 100,000 clinic visits and 14,000 surgical procedures/year
- 14 major NIH (“R01”) grants held by 6 PhD scientists and 5 clinicians
- $12.5 million annual research budget (10% royalty reinvestment, 10% gifts, 30% Mayo; 45% federal, 5% industry)

Biomechanics Lab(s)
- Founded by EYS Chao in 1974
- Kai An 1994-2014
- Tim Hewett 2015-present
- Motion Analysis Lab (KR Kaufman)
- Tendon and Soft Tissue Biology lab (PC Amadio, C Zhao, A Gingery)

Bone biology and histomorphometry Lab(s)
- Founded by PJ Kelly in 1966
- JJ Westendorf, A van Wijnen, M Yaszemski, E Bradley, AT Bishop, AY Shin, M Abdel labs
How the story with the Mayo Clinic has started


Determination of the mechanical and morphological properties: musculoskeletal tissue

Sabine Bensamoun
How the story with the Mayo Clinic has started

2004-2006: Post Doc

Dr Amadio  Dr An

Orthopedic Biomechanics Laboratory
Room GÜ 1-28
Elastography development for muscle → thigh

Set up of elastography plateform
Muscle and liver applications

Role of TIEG1 in tendon
Development mechanical test

New role of TIEG1 in muscle

Sabine Bensamoun
2006: Post doc

2019: Research collaborator

14 years after

R. Ternifi  M. Kammoun

Sabine Bensamoun
Potential project with the Orthopedic Biomechanics Laboratory

TSTB Lab current research interests

- Tendon lubrication
- **Tendon tissue engineering** (Zhao)
- Tendinopathy (Gingery)
- Carpal tunnel biology and aging (Gingery)
- **US imaging** of carpal tunnel

Mechanical biomarkers to individualize treatment of carpal tunnel syndrome ("sorting hat")

- Median nerve **stiffness** (SWE)
- Relative motion of nerve, **tendons**, synovial tissue; **shear index**

Collaboration with S Bensamoun

- TGF Inducible Early Gene (TIEG) studies—effect of TIEG knockout on tendon mechanics
- MR Elastography

Peter Amadio
Collaborations

• Mayo Clinic’s Office of External Research Collaborations is responsible for the development of formal collaborations that go beyond investigator-to-investigator collaborations, and include formal agreements on sharing of intellectual property, data, resources, and funds.

• Examples of Mayo interinstitutional collaborations include Karolinska Institutet, Arizona State University.