

Bridging the Gap for Faster Adoption of GenAI in Healthcare

Franz Wotawa

Graz University of Technology, Institute of Software Technology, Graz,
Austria

wotawa@ist.tugraz.at

TU Graz at a Glance

Overview

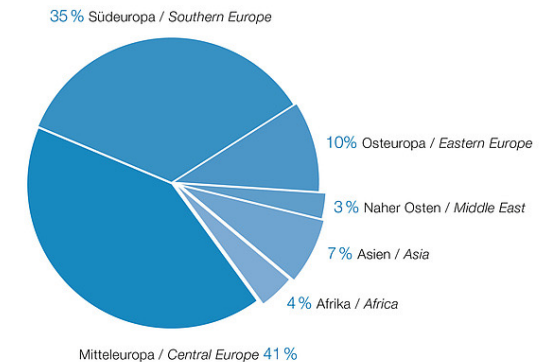
- Founded 1811 by Archduke Johann (oldest engineering-oriented university in Austria)
 - More than 200 years!
- A lot of cooperation with public bodies and industry:
 - Public-private partnerships
 - Company-funded projects
 - Endowed professorships (13)
 - ...
 - Public-public partnerships
 - Other universities (Austria and abroad)
 - Politecnico Milano
 - TU Darmstadt
 - TU Munich
 - Tongji University Shanghai
 - ...

Facts & Figures

- 3,935 staff total
 - of which are academic staff 1,932
 - of which are mandated instructors/student assistants 854
 - of which are non-academic staff 1,151
- 13,443 regular students
- 7 faculties
- 96 institutes
- 3 campus locations in Graz
- 208.6 mio € federal budget 2023
- 88.4 mio € income from third-party funds 2023 (incl. CAMPUSonline)

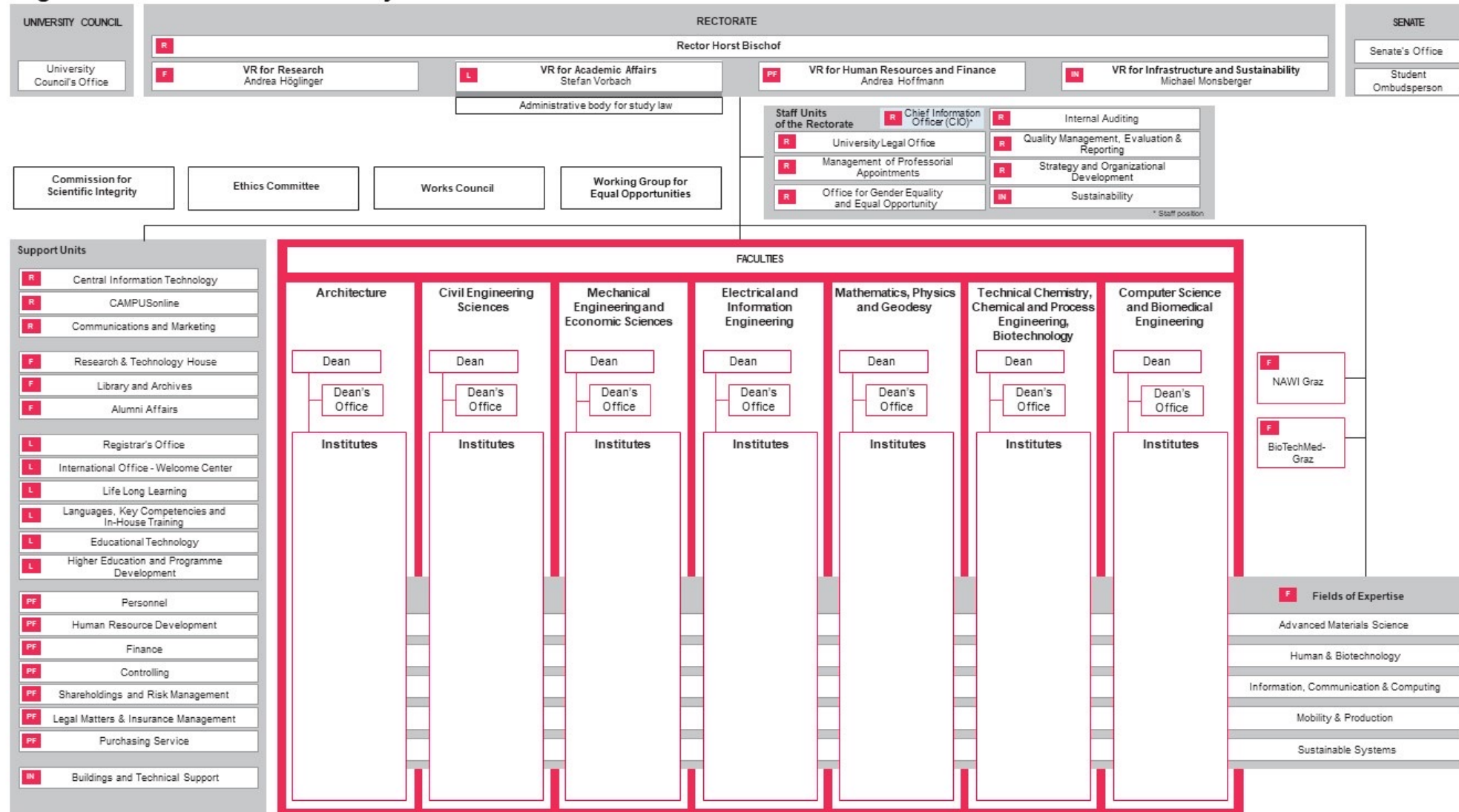
Internationale Studierende nach Regionen International Students by Region

Wintersemester / Winter Semester 2023/24
Quelle: Wissensbilanz 2023 / Source: Intellectual Capital Report 2023



TU Graz at a Glance (cont.)

Organizational chart as of January 2024



Motivation

- The rapid development of Generative AI (GenAI) offers tremendous opportunities in healthcare, from diagnosis and treatment recommendations to personalized medicine.
- <https://www.gesundheitswirtschaft.at/wie-ki-unser-gesundheitssystem-revolutioniert/>
- <https://investinaustria.at/en/blog/revolution-in-medical-research-through-ai/>
- <https://data-science.meduniwien.ac.at/en/institutes/artificial-intelligence/research/>
- <https://buildwellbeing.fhstp.ac.at/>
- <https://aihta.at/page/anwendungen-von-kuenstlicher-intelligenz-in-der-medizin-fokus-spital/en>

'World's first' AI hospital with virtual doctors opens in China



By **URSULA O'SULLIVAN-DALE** — May 30, 2024 ⌚ 2 Mins Read

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Chinese researchers have developed an AI hospital town, similar to Stanford's AI town, which went viral last year. The AI hospital, named "Agent Hospital," was developed by researchers from Tsinghua University.

- <https://www.roboticsandautomationmagazine.co.uk/news/health-care/worlds-first-ai-hospital-with-virtual-doctors-opens-in-china.html>



GESUNDHEIT

Künstliche Intelligenz hilft bei Krebsvorsorge

In der Medizin kommt immer häufiger Künstliche Intelligenz (KI) zum Einsatz. Im Universitätsklinikum St. Pölten hilft sie etwa bei Darmspiegelungen, bösartige Polypen zu identifizieren. Für die Erkennung von Melanomen, also Hautkrebs, gibt es auch Apps für Laien.

23. März 2024, 17.27 Uhr

Teilen 

Ist ein Muttermal unauffällig oder möglicherweise bösartig? Der Facharzt oder die Fachärztin muss sich für diese Einschätzung nicht mehr allein auf seine oder ihre Erfahrung verlassen, sondern kann auch mit Unterstützung einer KI arbeiten. Diese analysiert eine Aufnahme des Muttermals und gibt eine Wahrscheinlichkeit an, mit der dieses ein Melanom sein könnte.

Artificial intelligence helps with cancer prevention

- <https://noe.orf.at/stories/3248585/>



A novel AI-based virtual patient navigator, MyEleanor, improved colonoscopy uptake among U.S. patients

Chronik

Abonnieren

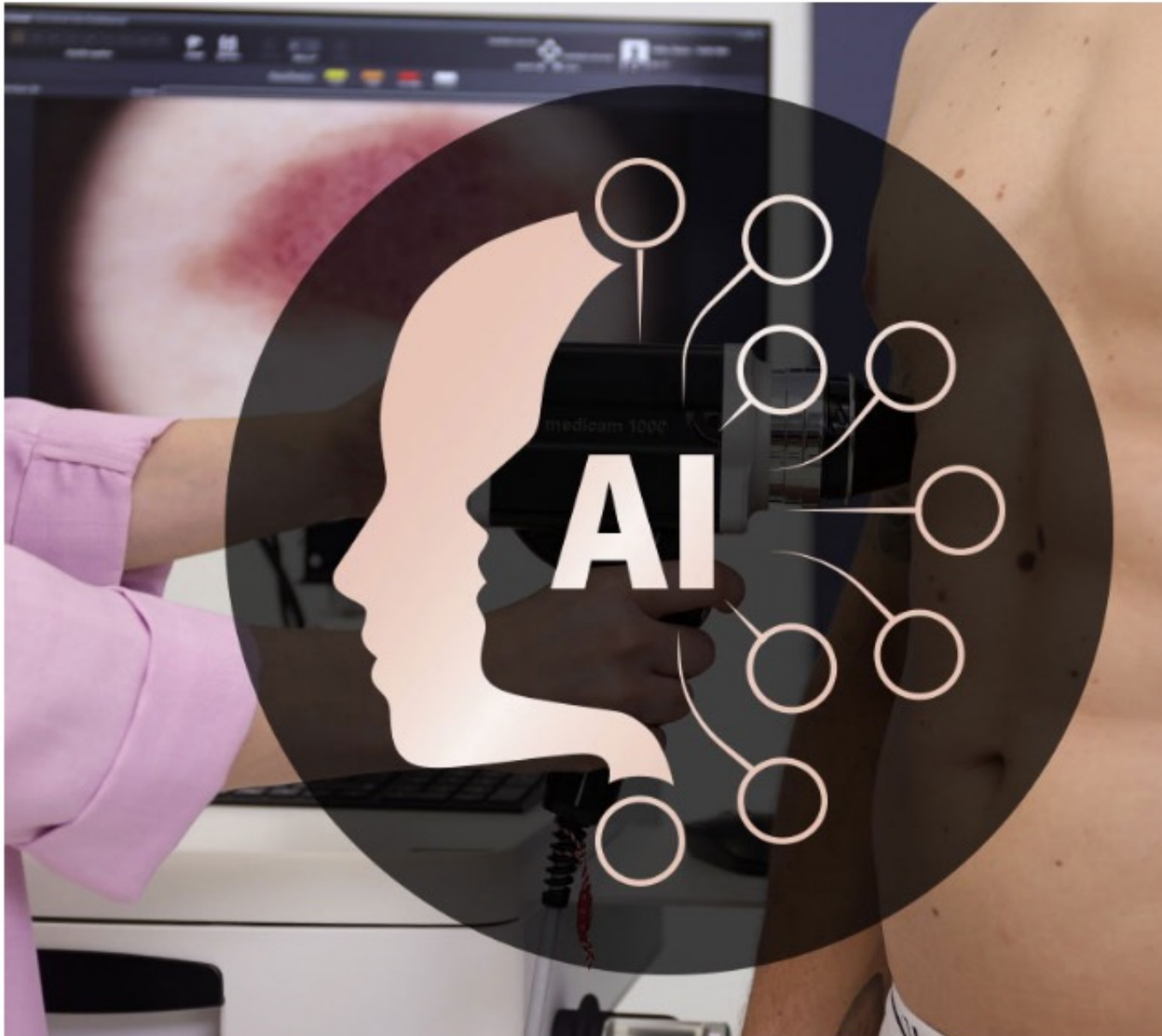
ChatGPT rief 2.000 Menschen wegen Krebs-Vorsorge an

13. Juni 2024 · Lesedauer 3 min ▶ Artikel vorlesen

Eine Vorsorge-Koloskopie alle zehn Jahre oder ein FIT-Stuhltest alle zwei Jahre ab dem Alter von 45 Jahren kann die Sterblichkeit durch Darmkrebs drastisch verringern. Doch viel zu wenige potenziell Betroffene machen davon Gebrauch. In den USA versucht man jetzt, die Menschen per Sprachroboter zu kontaktieren und zur Untersuchung zu überreden.

- <https://www.puls24.at/news/chronik/kuenstliche-intelligenz-kann-zur-krebs-vorsorge-raten/330588>

NEUE DIAGNOSEMETHODE IN DER MUTTERMALKONTROLLE



AIMEE - new assistant for *Artificial Intelligence Mole Examination and Evaluation*. Powered by FotoFinder AI, AIMEE is revolutionizing the pre-assessment of skin lesions and streamlining your dermoscopy workflow. AIMEE speeds up your decision-making and serves as a valuable training tool for physicians.

- <https://www.hautarzt-1020.at/leistung/muttermalkontrolle-mittels-kuenstlicher-intelligenz/>

Key elements

.. needed to successfully integrate GenAI into healthcare:

1. Regulatory Framework: AI Acts and Policy Alignment
 - a. Quality assurance methods according to standards and regulations
 - b. Certification
2. Ethical Considerations: Ensuring Patient Safety and Trust
3. Intellectual Property (IP) and Innovation Protection

Regulatory Framework: AI Acts and Policy Alignment

- **AI Act Compliance** - the [EU's proposed AI Act](#) sets strict guidelines for high-risk AI systems, like those in healthcare, covering safety, transparency, and human oversight.
- **Need for Harmonization** - align the policies with EU AI acts to ensure compliance, smooth integration and potential international collaborations.
- **Challenges and Solutions** - tailoring policies for local healthcare systems while remaining compliant with overarching EU standards is crucial. Capacity building and regulatory updates are needed.

In Austria - **Artificial Intelligence Mission Austria 2030**
<https://www.digitalaustria.gv.at/Strategien/Strategie-der-Bundesregierung-f-r-K-nstliche-Intelligenz--AIM-AT-2030-.html>



Ethical Considerations: Ensuring Patient Safety and Trust

- **Ethical Guidelines in the EU** - EU regulations emphasize ethical principles such as transparency, fairness, and accountability in AI systems.
- **Adopting Ethical Standards** - must establish national ethical guidelines compatible with EU standards, ensuring GenAI systems prioritize patient safety, avoid biases, and maintain data privacy.
- **Data Privacy and Security** - the General Data Protection Regulation (GDPR) serves as a model for managing sensitive patient data, which has to be integrated into the developed GenAI frameworks.

In Austria:

- Research projects

<https://www.ki-strategie.at/erfolgsgeschichten/digitalisierung-und-ethik-wie-man-ethische-grundsätze-in-einer-digitalisierten-verwaltung-anwendet/>

- Training programs

<https://www.vab.gv.at/bildungsprogramm/digitale-transformation-2025/kurs.html?vid=32723&tid=99458>

- High-Caliber Expertise in the AI Advisory Board

<https://www.digitalaustria.gv.at/Themen/KI/AI-Advisory-Board.html>



 KI-BEIRAT

Die derzeitigen Mitglieder des Beirats:

- Horst Bischof (TU Graz)
- Markus Fallenböck (Uni Graz)
- Nikolaus Forgó (Uni Wien)
- Sabine T. Köszegi (TU Wien)
- Bernhard Moser (ASAI)
- Clara Neppel (IEEE Technology Centre GmbH)
- Walter Peissl (Akademie der Wissenschaften)
- Carina Zehetmaier (Women in AI)
- Erich Albrechtowitz (Bundeskanzleramt)
- Dr. Jeannette Gorzala (AI Austria)
- Mag.a Verena Krawarik (Austria Presse Agentur)

Intellectual Property (IP) and Innovation Protection

- **IP Laws in GenAI** - clear rules on ownership, patents, and copyright for AI-generated innovations are evolving across the EU.
- **Local IP Framework** - need to modernize IP laws to protect GenAI-driven healthcare innovations and encourage research and development.

In Austria

<https://www.rtr.at/ki-servicestelle>



KI-Servicestelle

Die Rechtsgrundlage für die KI-Servicestelle bilden [§ 20c KOG](#) und [§ 194a TKG \(BGBl. I Nr. 6/2024\)](#).

Die in der RTR eingerichtete Servicestelle für Künstliche Intelligenz dient als Ansprechpartner und Informationshub einer breiten Öffentlichkeit zum Thema KI. Sie unterstützt auch bei der Umsetzung des europäischen AI Act. Auf diesen Seiten finden Sie Informationen rund um regulatorische Rahmenbedingungen beim Einsatz von künstlicher Intelligenz sowie den Aspekten im Hinblick auf Cybersecurity, Datenökonomie und deren Einsatz im Medienbereich.

Unser Informationsangebot wird laufend erweitert und ist, soweit nicht anders angegeben, unter [CC BY 4.0](#) frei lizenziert. Bei Fragen können Sie uns jederzeit [kontaktieren](#). Am Ende der Seite finden Sie die Möglichkeit, sich für einen eigenen RTR-KI-Newsletter anzumelden. Außerdem finden sie dort die Links zu unserem Social Media-Auftritt, wo wir ebenfalls Informationen teilen.

... And there is more ...

- Standards and regulations for medical products!
 - As an integral part of a medical product, AI needs to consider all regulations and standards!
 - **Regulation (EU) 2017/745** *is a regulation of the European Union on the clinical investigation and sale of medical devices for human use.*
 - *Reusable surgical instruments*
 - *Products without an intended medical purpose*
 - **Regulation (EU) 2017/746** *on in vitro diagnostic medical devices.*
 - **Regulation (EC) No 1394/2007** *on advanced therapy medicinal products*
 - **ISO 13485** *focuses on patient safety by ensuring consistent quality throughout the entire lifecycle of medical devices, from design and production to disposal.*
 - ISO 13485 is a stand-alone QMS standard based on ISO 9001:2008, which has been superseded by ISO 9001:2015
 - **ISO/IEC 27001:2022** - Information security, cybersecurity and privacy protection — Information security management systems — Requirements

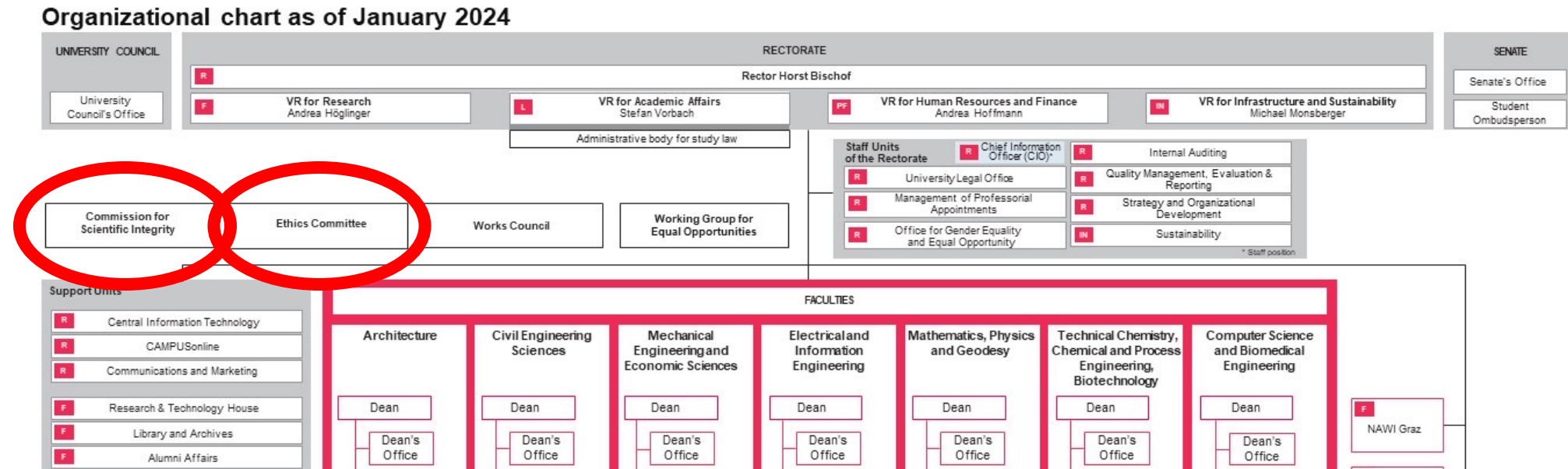
... And more ...

- MEDICAL DEVICE SOFTWARE
 - Certification regarding IEC 62304
 - ...
- Quality must be assured.
 - Processes (established, formalized, documented,...)
 - Ordinary QR (correctness, completeness, usability, security,...)
 - We may face problems regarding the use of external libraries (e.g., ChatGPT)
 - Challenges: “Hallucination of GenAI”, “Explainability”, “Tool overreliance”,...

Alexander Perko and Franz Wotawa, Testing ChatGPT’s Performance on Medical Diagnostic Tasks, Proceedings of the 27th International Multiconference Information Society – ChatGPT in Medicine, Oct. 9th, 2024, Ljubljana, Slovenia.

Alexander Perko, Iulia Nica, and Franz Wotawa, Using Combinatorial Testing for Prompt Engineering of LLMs in Medicine, Proceedings of the 27th International Multiconference Information Society – ChatGPT in Medicine, Oct. 9th, 2024, Ljubljana, Slovenia.

Support from the Side of TU Graz (Projects,...)



- Established commissions and committees
 - Ethics approval required for projects

Support from Side of TU Graz (cont.)

- Commission for Scientific Integrity

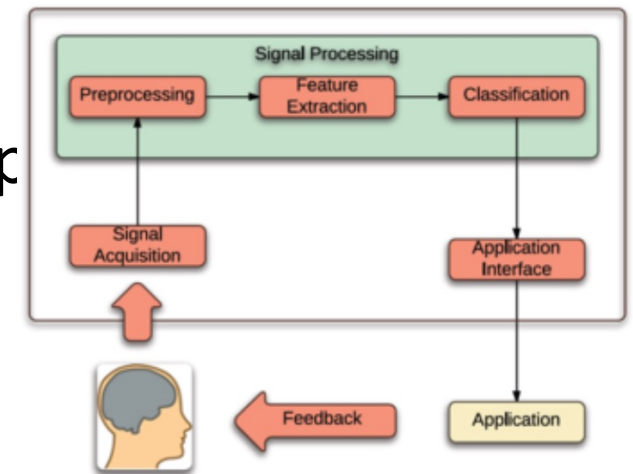
*“CSI has the task of acting as a **confidential and advisory contact point for members of TU Graz, in particular those involved and the Rectorate, in the event of suspected violations of the principles of good scientific practice. The CSI clarifies cases of suspected scientific misconduct within the university and determines whether scientific misconduct has occurred.**”*

- Ethics Committee

- *decides on the ethical justifiability of scientific publications and research projects as well as research funding topics,*
- *advises university management bodies on ethically relevant topics at TU Graz and*
- *promotes awareness of ethical issues at TU Graz.*

Commission for Scientific Integrity and Ethics Committee

- Since 2024, two separate entities
 - Before: one committee that did not really consider ethical questions
 - TU Graz was always asking the ethics committee of the Medical University of Graz in case of critical questions.
 - More time and effort needed!
- Services:
 - Guidelines on Safeguarding Good Scientific Practice
 - Best Practice Guide for Research Integrity and Ethics
- The **Ethics Committee** is essential when applying for p
 - **Ethics approvals**
 - Example from the Faculty of Computer Science and Biomedical Engineering: Brain-Computer Interfaces!



All Representative Bodies for Members of TU Graz

Working Group for Equal Opportunities >	Representative for People with Disabilities >	Works Council for Administrative Personnel >	Works Council for Academic Personnel >
Commission for Scientific Integrity >	Ethics Committee at TU Graz >	TU Graz Student Union >	Young Workers' Council >
TU Graz Student Ombudsperson >	Arbitration Board of TU Graz >		

Further support from Side of TU Graz

Services of the Research & Technology House

- [Research Newsletter “F&T News” >](#)
- [TU Graz Internal Funding Programmes and Prizes >](#)
- [Support of Third Party Funded Projects >](#)
 - Project Planning, Application and Offer Stage (pre-award)
 - During or After Project Start and During Project Run Time Post Award)
 - Project Management and Administration
- [National Research Funding and the EU Programme Horizon Europe >](#)
 - EU Programme Horizon Europe
 - Databases for Funding
- [Offers for Post-docs >](#)
- [Research Documentation >](#)
 - Electronic Registration Process for Third-party Funded Projects
 - R&D Areas and Projects
 - Theses
 - Publications
- [Commercialisation of Research Results: Patents,](#)



Contact

Research & Technology House
Mandellstraße 9/II
8010 Graz
Phone: +43 316 873 6031
or +43 316 873 6032
forschung@tugraz.at ✉
[Area Map](#) ↗
[Contact person and Tasks >](#)

Research Newsletter “F&T News”

TU Graz Internal Funding Programmes and Prizes

Support of Third Party Funded Projects

National Research Funding and the EU Programme Horizon Europe

Commercialisation of Research Results: Patents, Inventions and Technology Exploitation

- The Research & Technology House advises and supports researchers at TU Graz by helping from contract design before project start, along generation of an invention as well as with patenting and licensing or selling an invention.
- Technology offers:
 - Interested external parties can find out about technology offers on new developments, inventions and technologies at the Research & Technology House. You can find a list of available technologies on the [Wissenstransferzentrum \(WTZ\) Süd](#). To the [Wissenstransferzentrum \(WTZ\) Süd](#)
 - These services support commercialisation of research results. The Research & Technology House acts as a one-stop-shop with its close link to the Rectorate, legal department and external persons such as patent offices and patent attorneys.

...including founding a company

- The Research & Technology House supports students and employees who wish to set up their own company as a start-up or spin-off (i.e. an IPR contract based start-up), supports proposals for FFG Spin-Off-Fellowships funding programme and provides helpful contacts, such as with Gründungsgarage or Science Park Graz.

Summary

- There are a lot of standards and regulations
 - Considering AI (which is applicable to GenAI)
 - Considering Medicine and its applications (EU Regulations and Quality Assurance Standards)
 - Considering Privacy and Security
- Hard to have a broad and complete overview of existing standards and regulations
- There is a need to support researchers in this area
 - Need for ethics committee
 - Need to establish procedures and processes
 - Support project applications, commercialization, and company foundings

Conclusion: Path to Successful Integration

- Research support is needed considering:
 - Strengthening regulatory frameworks in line with the EU AI Act.
 - Embedding ethical guidelines that safeguard patient trust and data privacy.
 - Modernizing IP laws to support innovation.
- Have a single point of contact for all ethical questions that have to be considered when applying for projects
- Support for companies (spin-offs) for fast deployment of research results