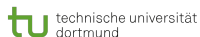


The Lamarr Institute for Machine Learning and Artificial Intelligence - Natural Language Processing

Conversational AI and Social Analytics (CAISA) Lab

Prof. Dr. Lucie Flek / Dr. Florian Mai

Partner institutions:



Institutionally funded by:



Ministerium für
Kultur und Wissenschaft
des Landes Nordrhein-Westfalen



LAMARR AI INSTITUTE

4

INSTITUTIONS

TU Dortmund University
University of Bonn
Fraunhofer IAIS
Fraunhofer IML

3

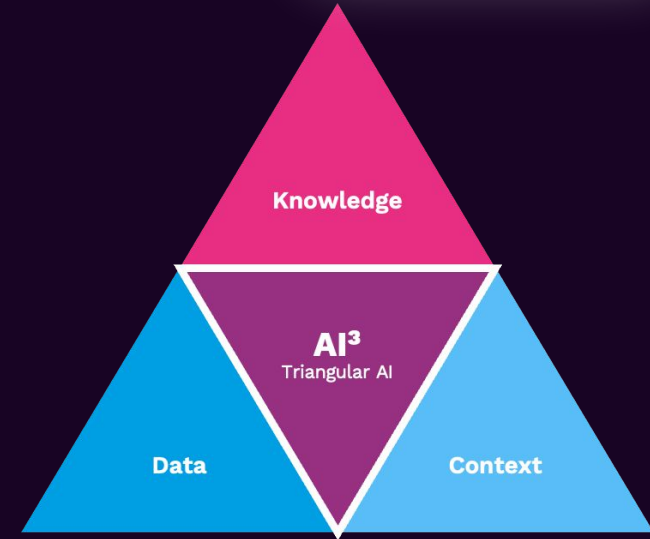
LOCATIONS

Bonn
Dortmund
Sankt Augustin

40+

AI PRINCIPAL
INVESTIGATORS

and their
research teams



Fundamental AND Applied AI Research

Resource-aware



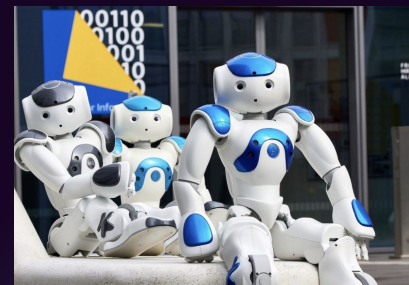
Human-Centered



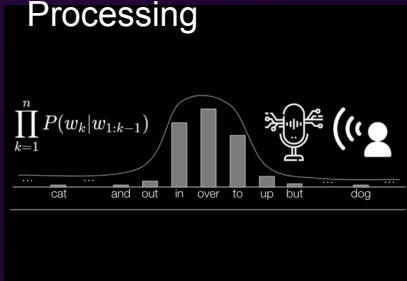
Trustworthy, Hybrid



Embodied AI Systems



Natural Language
Processing



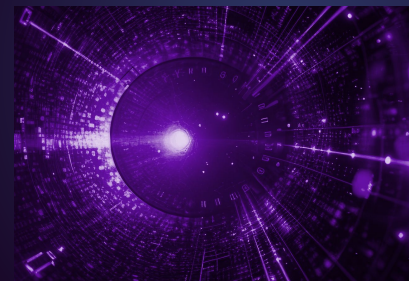
Life Sciences



Logistics & Production



Astroparticle physics



Lamarr NLP Core Research Groups

Data Science and
Language Technologies



Prof. Dr. Lucie Flek
University of Bonn (Area Chair)

Foundation Model
Developments



Dr. Mehdi Ali
Fraunhofer IAIS

Applied Machine
Learning and NLP



Prof. Dr. Rafet Sifa
University of Bonn / IAIS

Natural Language
Processing Applications



Dr. Hector Allende-Cid
Fraunhofer IAIS

NLP Area Coordinators:



Dr. Akbar Karimi
2023-2025

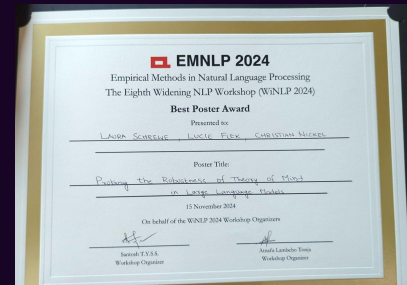


Dr. Florian Mai
2026 -

Vertical NLP Contributors:

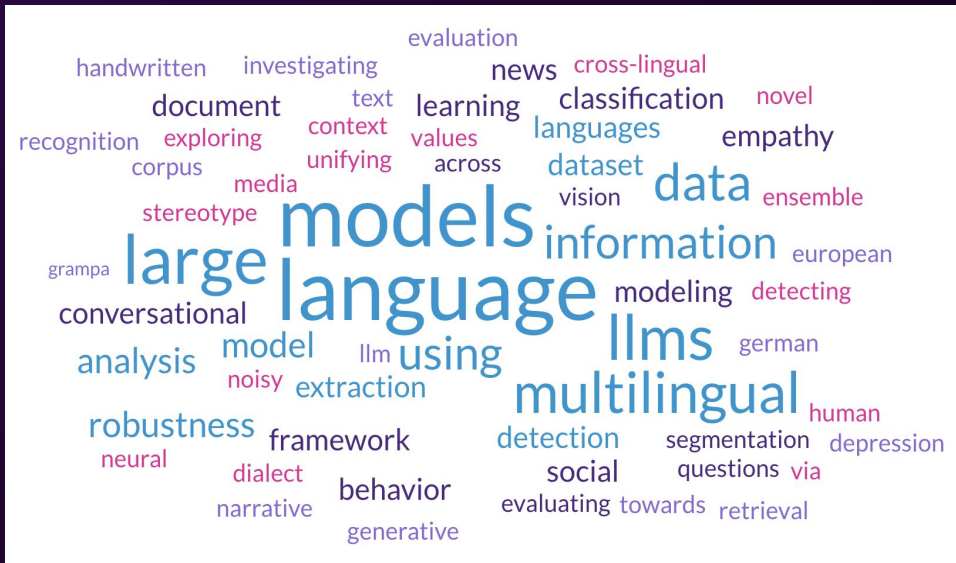
- LLMs for Biomedicine
- LLMs for Physics
- LLMs for Mental Health / Psychology
- LLMs for Social Sciences / Media
- LLMs for Logistics
- Efficient ML for LLMs

1 Research and Impact in NLP



- 40+ peer reviewed papers per year, including core A* venues in NLP and ML
 - 2025: ACL (8x), EMNLP (2x), Interspeech, ICWSM, ECIR, ECML, workshops of IJCAI, ICLR, NeurIPS, AAAI...
- keynotes at NLP venues, invited talks in US & Asia, journal paper on LLMs in Nature
- release of Teuken – the European LLM based on OpenGPT-X, Open-source code and data to most papers
- 2 Lamarr NLP Alumni now Professors in Canada, 2 Emmy-Noether Applications submitted

2



Adversarial Robustness, Multilinguality, Hallucination

Reasoning and Planning, ML Efficiency

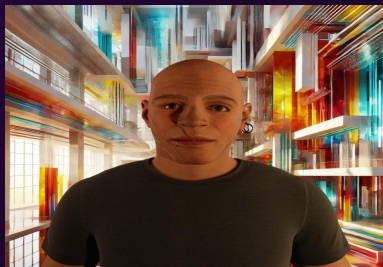
LLM Alignment,
Human Values,,
Pluralism,
Empathy,
Safety

Societal and Domain Impact
(AI for Science, AI for Social Good, etc)

3 Public Activities



Visit of Stanford HAI and Stanford Robotics, with a joint research presentation to Hendrik Wüst



Dortmund Art Museum Project "Talk to me"



AI Panel at BMBF/BMFTR

- Organization of numerous conferences, workshops, panels, visits of US and Canada
 - 2025: International Conference on Natural Language Generation (Hanoi), Conference on AI Risks (Leuven), Workshop on Bridging Neurons and Symbols for NLP (Abu-Dhabi), Human-Centered LLMs (Bangkok)...many more
 - Dagstuhl 2026 Seminar on Social Artificial Intelligence (with Harvard, CMU and JHU)
 - Workshops at global NLP events, e.g. Human-Centered LLMs at ACL 2024 (with Cohere and Stanford), ECML Challenge on Adversarial Attacks
- Release of Teuken – open European OpenGPT-X LLM

4 Global Collaborations and Network

**International Paper or Grant Co-Authors
2025:**

**Lamarr NLP Visiting
Researchers 2025:**



- Johanne Trippas (RMIT University)
- Nava Haghighi (Stanford University)
- Jeanne Powell (Emory University School of Medicine)
- Lea Fermann (Melbourne University, Australia)
- Marco Antonio Stranisci (University of Turin)
- Shakila Mahjabin Tonni (Data61, CSIRO, Australia)
- Shivani Kumar (University of Michigan)
- Yash Kumar Atri (University of Virginia)
- Maximilian Müller-Eberstein (IT University of Copenhagen)
- Patrícia Schmidtová (Charles University)
- Harsh Trivedi (Stony Brook University)
- Tianyi Zhang (University of Pennsylvania)
- Tim G. Rudner (NYU Data Science)
- Zeerak Talat (MBZUAI / Edinburgh University)

Third-Party Funding Projects

- Excellence Cluster Dynaverse (focus: LLMs for Scientific Discovery)
- ERC Starting Grant “LLMpathy: Understanding the Interplay of Human Modeling and Social Intelligence via Large Language Model-Based Simulations”
- EuroHPC funds for training multilingual models, reasoning, distillation
- BMBF ErUM Data Projects: AI Safety, AI Agents for Physics
- DFG Weave: “Hyperbolic Interlingual Representations” with Ben Gurion University
- TRA Projects: LLMs for Gene Network Regulation, LLMs for Gravit. Waves, AI for Dietary Assessments, enaCom AI for Telemedicine

5 Internal Collaborations in NLP Among PIs

Judging Quality Across Languages: A Multilingual Approach to Pretraining Data Filtering with Language Models

Mehdi Ali^{1,2†} Manuel Brack^{3,5†} Max Lübbering^{1,2†} Elias Wendt^{5†} Abbas Goher Khan^{1†}
Richard Rutmann^{1,2} Alex Jude² Maurice Kraus⁵ Alexander Arno Weber^{1,2}
David Kaczér¹ Florian Mai¹ Lucie Flek¹ Rafet Sifa^{1,2} Nicolas Flores-Herr²
Joachim Köhler^{1,2} Patrick Schramowski^{3,4,5} Michael Fromm^{1,2} Kristian Kersting^{3,4,5}

¹Lamarr Institute, ²Fraunhofer IAIS, ³DFKI SAINT,
⁴Hessian AI, ⁵TU Darmstadt

Do Multilingual Large Language Models Mitigate Stereotype Bias?

Shangrui Nie^{1,3}, Michael Fromm^{2,3}, Charles Welch^{1,3}, Rebekka Görges^{2,3}, Akbar Karimi^{1,3},
Joan Plepi^{1,3}, Nazia Afsan Mowmita^{2,3}, Nicolas Flores-Herr^{2,3}, Mehdi Ali^{2,3}, Lucie Flek^{1,3}

¹Conversational AI and Social Analytics (CAISA) Lab, University of Bonn, Germany
²Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS), Germany
³Lamarr Institute for Machine Learning and Artificial Intelligence, Germany

MultiProp Framework: Ensemble Models for Enhanced Cross-Lingual Propaganda Detection in Social Media and News using Data Augmentation, Text Segmentation, and Meta-Learning

Farizeh Aldabbas^{*,†}, Shaina Ashraf^{*,†}, Rafet Sifa^{*,‡}, Lucie Flek^{*,†}

^{*}University of Bonn, [†]Conversational AI and Social Analytics (CAISA) Lab, [‡]Fraunhofer IAIS

INVESTIGATING LANGUAGE-SPECIFIC CALIBRATION FOR PRUNING MULTILINGUAL LARGE LANGUAGE MODELS

Simon Kurz^{†*} Jian-Jia Chen^{†*} Lucie Flek^{◊*} Zhixue Zhao[‡]

[†]TU Dortmund University, [◊]University of Bonn, [‡]University of Sheffield,

^{*}Lamarr Institute for Machine Learning and Artificial Intelligence

Enforcing Fundamental Relations via Adversarial Attacks on Input Parameter Correlations

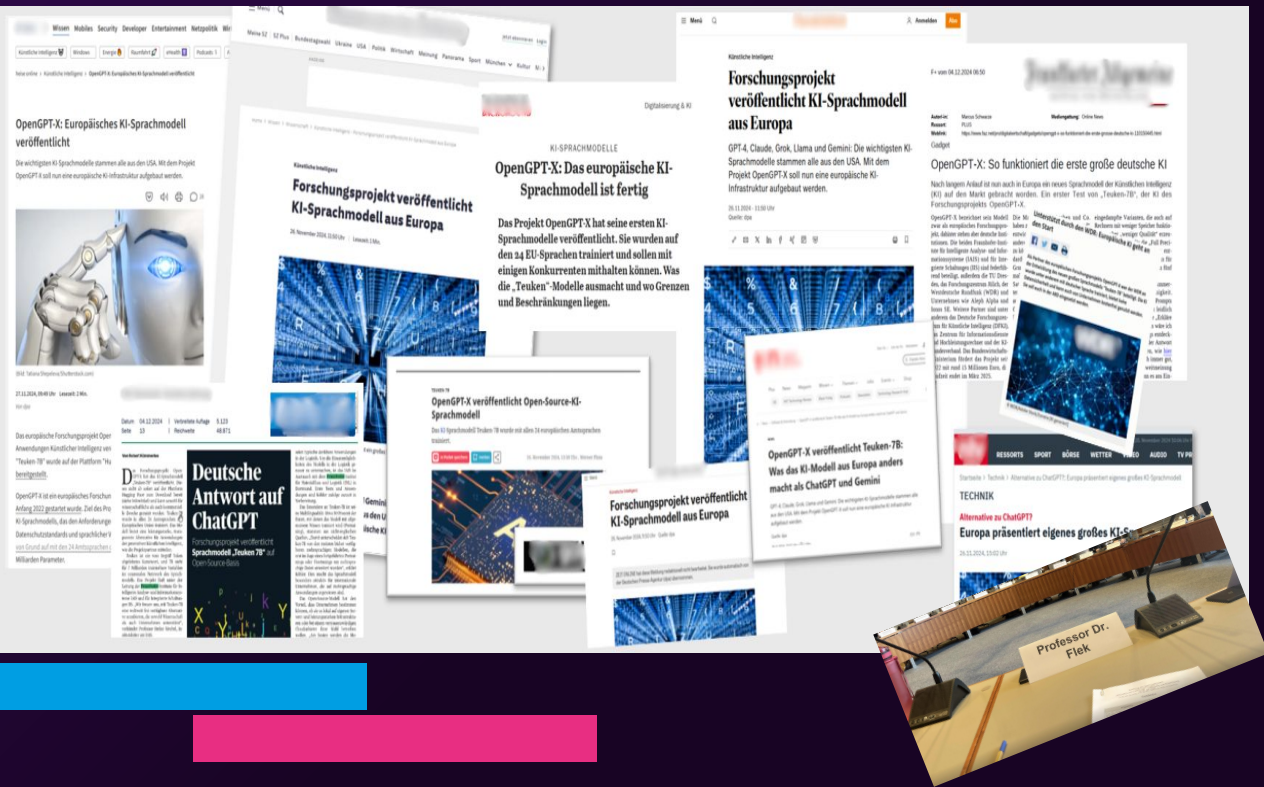
AI Safety Project Group (Lucie Flek², Alexander Jung⁴, Akbar Karimi², Timo Saala¹, Alexander Schmidt⁴, Matthias Schott¹, Philipp Soldin³, and Christopher Wiebusch³)

¹ Institute of Physics, University of Bonn, Germany

² Bonn-Aachen Institute of Technology, University of Bonn, Germany

³ Institute of Experimental physics ILLP, RWTH Aachen University, Germany

6 Industry and Policy Impact



> 100,000 model downloads
of Teuken models at Hugging Face

> 50 Press articles
Forbes, Major german news outlets..

> 33 million outreach
(dpa, heise, FAZ, Handelsblatt etc.)

AI consultations to
Landtag and Bundestag
Lernende Systeme, Ki-Klub etc

- 32k students of which >4k international, >6k PhDs, 600 Professors
- Founded 1818
- One of the top 10 German universities ("**University of Excellence**" award under the continuously reviewed German Universities Excellence Initiative)
- Top 7 in Germany, Mathematics top 41 worldwide (Shanghai ranking)
- 6 granted Excellence Cluster initiatives (the most of any German university), 11 Nobel Laureates, 5 Fields Medalists, 12 Leibniz Prize winners
- Notable alumni e.g. Heinrich Hertz, Karl Weierstrass, Karl Marx, Konrad Adenauer, Thomas Mann, Heinrich Heine, pope Benedict...



- Part of the faculty of natural sciences
- In the downtown, close to the train station (Bonn is very bikeable 300k citizen town)
- About 2000 students and 30 profs
- Close cooperation with many applied research institutes in Bonn
- [Fraunhofer-Institut für Intelligente Analyse](#)
- Fraunhofer-Institut für Kommunikation, Informationsverarbeitung,
- Lamarr Institute for Machine Learning and Artificial Intelligence, Informatik Society... <https://big.informatik.uni-bonn.de/>

b-it Bonn-Aachen
International Center for
Information Technology



Conversational AI and Social Analytics (CAISA) Lab

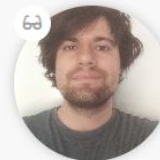
- Led by Prof. Dr. Lucie Flek
- Team:
 - 3 postdocs
 - 8 PhD students
- Part of Lamarr Institute for ML and AI and the Bonn-Aachen International Center for Information Technology
- Teaches 6 courses:
 - Intro to NLP
 - NLP Lab
 - Dialogue Systems
 - Foundations of Data Science
 - AI Ethics Seminar
 - LLM Seminar
- Strong research focus on NLP



Lucie Flek



Akbar Karimi



Florian Mai



Wei-Fan Chen



Christian Nickel



David Kaczér



Frederik Labonte



Lea Fischbach



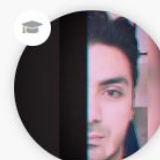
Olufunke Sarumi



Shaina Ashraf

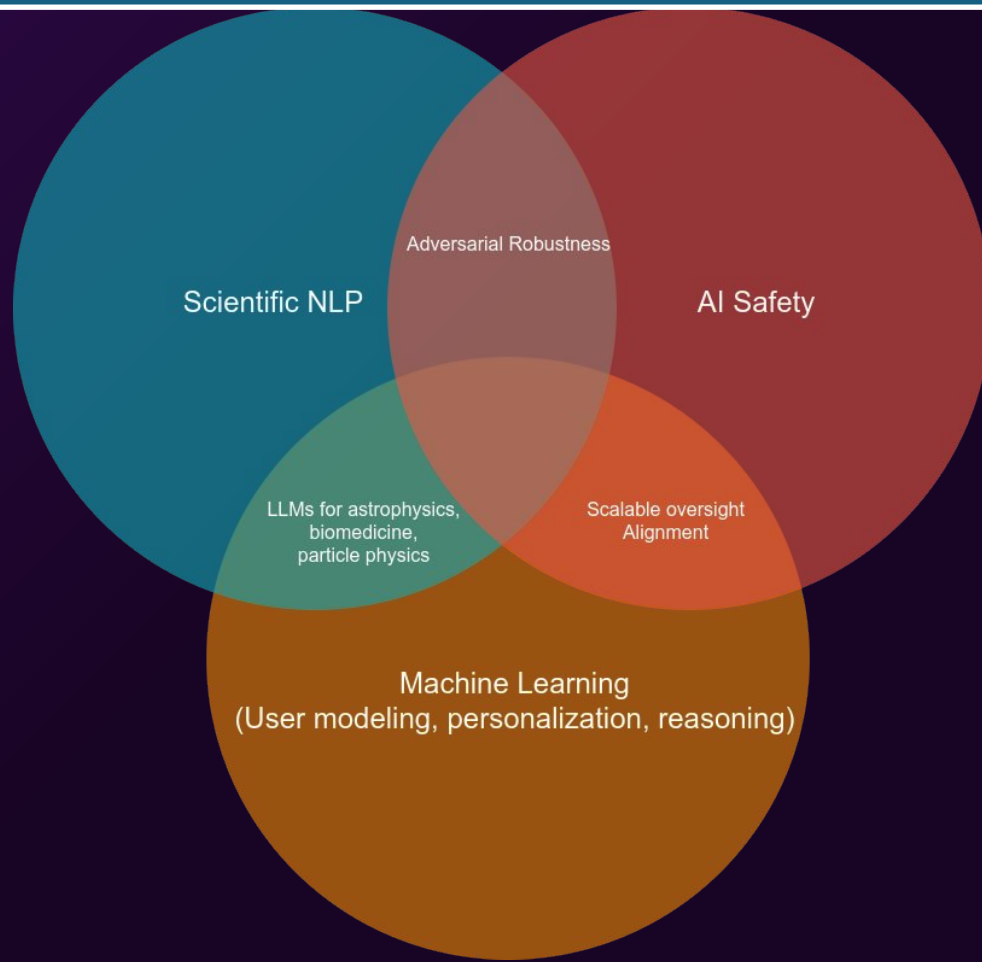


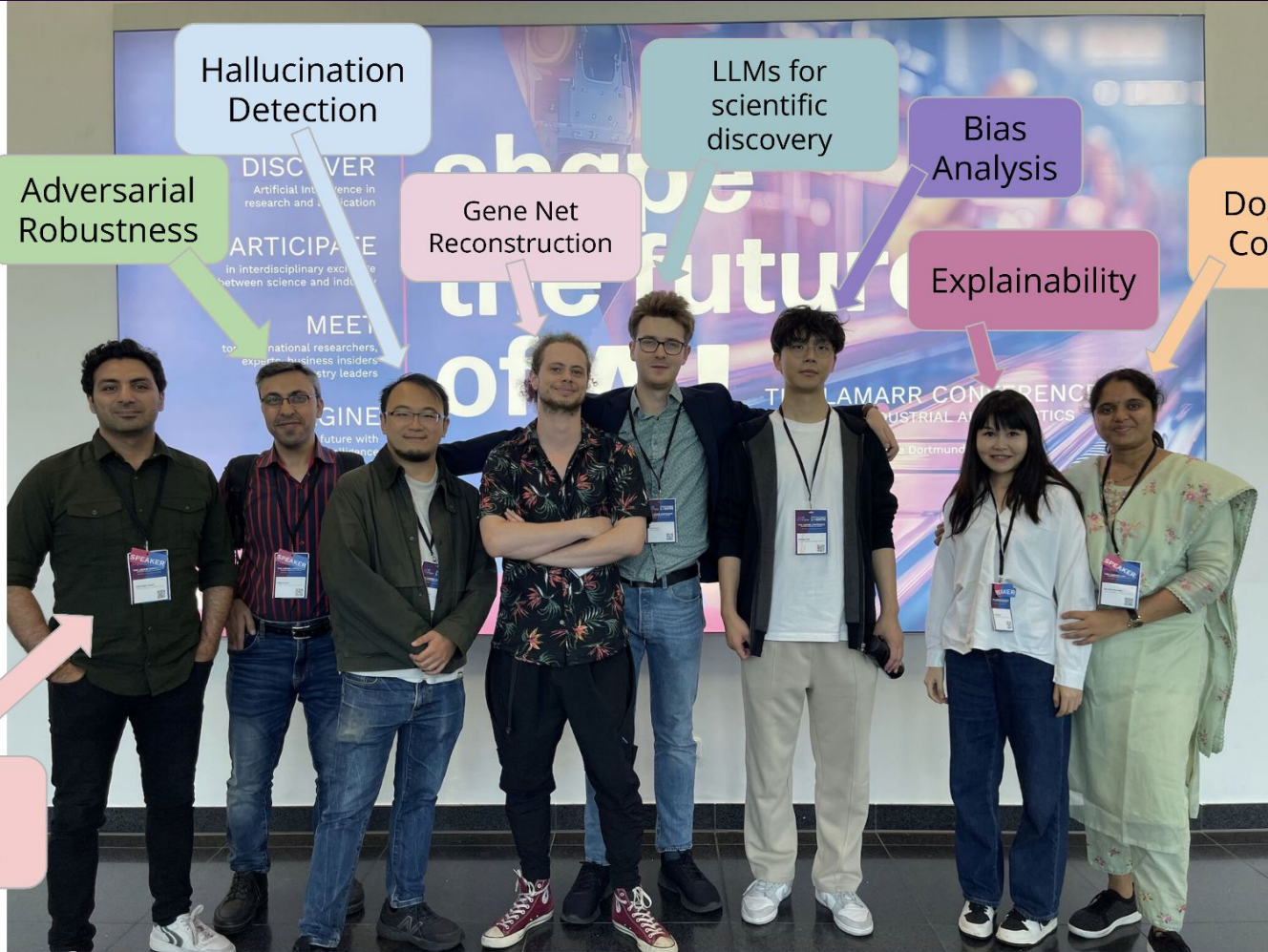
Shangrui Nie



Vahid Sadiri Javadi

CAISA Lab - Research areas





Hallucination
Detection

LLMs for
scientific
discovery

Bias
Analysis

Dogmatism in
Conversation

Explainability

Gene Net
Reconstruction

Adversarial
Robustness

Narrative
Reasoning

Health
Misinformation

Theory of
Mind
Robustness



Knowledge
Augmented
LLMs for QA



AI Safety
High Energy
Physics

Planning
Alignment

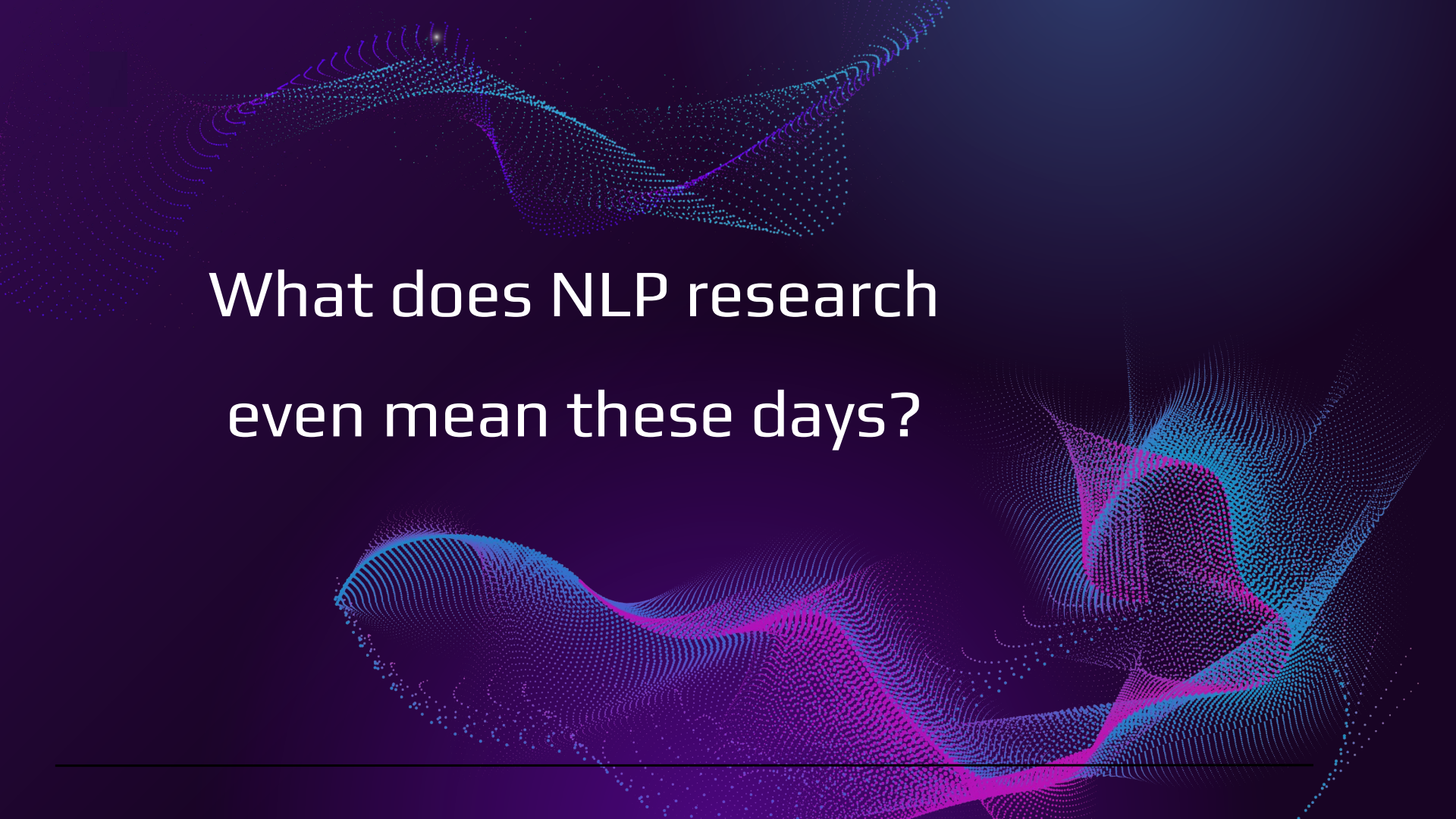
Propaganda
Detection

CAISA Lab - Come visit us!

Talk to us, if...

- You're interested in
 - scientific applications of LLMs
 - computational social science
 - bias and misinformation detection
 - LLM training and applications
 - AI alignment and safety
- You want a good research time! :)





What does NLP research
even mean these days?



Quo vadis, NLP?

NLP Contributions

Artifact Contributions



Method/Model



Dataset/Corpus



Task Definition

Knowledge Contributions



Model Analysis



Database Properties



Task Insights



Linguistic Findings



Societal Insights

For publishing,
is there a
competitive
advantage of
having an own
LLM to our
disposal?

Hint: Yes, but...



How to create an impact with an own LLM?

Machine Learning Research

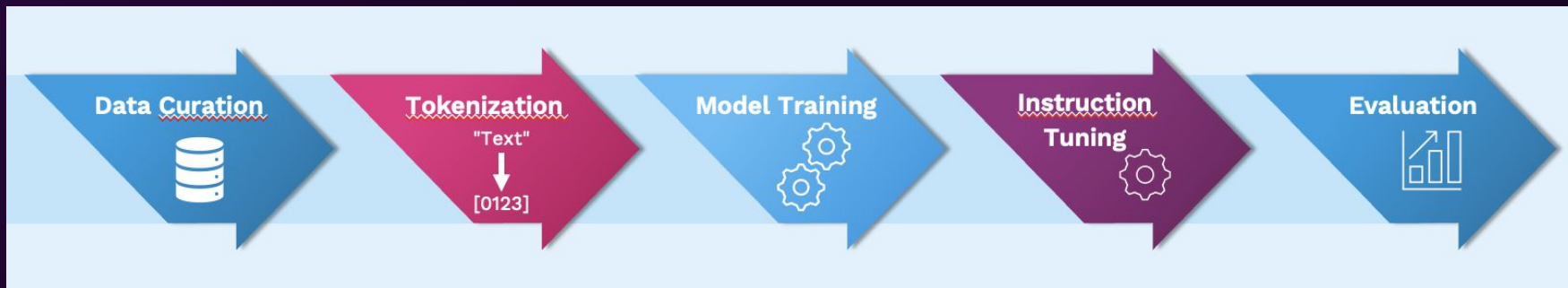
- Foundational ML / LLM contributions at scale
- Reasoning, Planning, Inference, LLM Agents
- Scalability and efficiency, distillation, symbolic learning

NLP Research

- Language transfer insights via multilingual LLMs, tok.
- Safety, Ethics, Culture,
- Factuality, Bias (mech. in.)
- Using LLMs to study discourse phenomena (empathy, toxicity, ambig.)

Release Open Infrastructure

- usability, modularity, reproducibility, maintenance
- models, data, tools
- Synergies and collaboration across Europe: HPC, Data infr.
(ALPS CSCS, Jülich...)





<https://lamarr-institute.org/research/natural-language-processing/>

Lucie Flek
@lucie_nlp