NLP & MEDICAL COMMUNICATION: TOOLS, SKILLS, PRACTICAL APPLICATIONS

31.08.2026 - 02.09.2026

Nicolaus Copernicus University, Centre for Language Evolution Studies, Toruń

Day 1 (31.08)

Venue: room 307, Collegium Maius NCU, ul. Fosa Staromiejska 3

9:30-10:15	*Presentation of Projects and Researchers: 4D Picture and Improving Communication in Pediatric Oncology.* - Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
10:15-11:00	*Vocational Sign Language on Medicine: the VSL on Medicine, VSL in Palliative Care, and VSL in Dental Medicine projects.* - Paulo Vaz de Carvalho
11:00-11:30	*Why is everything "significant"? Evidence-language leakage in English news, 2007–2025.* - Juan Olvido Perea García
11:30-12:00	**Coffee break**
12:00-14:00	*INCEpTION **Workshop**: Linguistic Annotation Software Applied to Medical Texts*. - Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
14:00-15:00	**Lunch break**
15:00-17:00	*LancsBoxX and Python **Workshop**: Introduction to Computational Linguistic Tools Applied to Medical Texts Analysis.* - Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
17:00-17:15	Open discussion and closing remarks
17:15-18:15	*One-on-one hands-on sessions** - Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
17:15	**Welcome drinks**

**Time for interested participants to consult with the workshop hosts individually or further practice workshop content.*

Day 2 (01.09)

Venue: Copernican Integration Centre, ul. Karola Olszewskiego 16a

9:30-10:00	*Linguistic markers use in depressive vs. non-depressive individuals - LIWC analysis.* - Antoni Żyndul
10:00-10:30	*The Contemporary Dictionary of Portuguese Sign Language: from the App to the Classroom.* - Paulo Vaz de Carvalho
10:30-11:00	*Modeling Persuasion in Online Communities: The PersOn Project* - Barbara Konat
11:00-11:30	**Coffee break**
11:30 - 13:30	*Measuring Psychological Constructs in Text Corpora* ***(Workshop)*** - Alessandro Miani
13:30-14:00	*Word–Body Discordance: A New Multimodal Construct for Clinical Self-Report - Proof of Concept in Relational Self-Silencing* - Bogna Bylicka
14:00-14:30	*What Does NLP Miss When It Models Only Text? Gesture, Dyadic Asymmetry and Neurodivergent Interaction.* - Agnieszka Sowińska
14:30-15:30	**Lunch break**
15:30-17:30	*EMPATHS* ***Workshop****: Emotional Design Applied to Healthcare Services.* - Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
17:30-17:45	Open discussion and closing remarks
17:45-18:45	*One-on-one hands-on sessions** Alessandro Miani, Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
17:45	**Barbecue**

**Time for interested participants to consult with the workshop hosts individually or further practice workshop content.*

Day 3 (02.09)

Venue: Copernican Integration Centre, ul. Karola Olszewskiego 16a

9:00-10:15	ICNT lab tour
10:15-12:15	*Co-creation Workshop and Presentation of Project Results.* - Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
12:15-12:45	**Coffee break**
12:45-13:30	*Pragmatic LLMs: Modeling Social Meaning Inference* ***(Workshop elements included)*** - Roland Mühlenbernd
13:30-14:00	*NLP and parenting practices* - Lidia Wiśniewska-Nogaj
14:00-14:15	*Supporting people after head and neck cancer - combining scientific empirical research with specialized Practice.* - Agnieszka Hamerlińska
14:15-14:30	*Designing for Understanding: Co-Creating and Testing Cancer Prevention Communication* - Oliwia Kowalczyk
14:30-15:30	**Lunch break**
15:30-16:30	*BERTAgent: Quantifying Linguistic Agency in Text* ***(Workshop elements included)*** - Jan Nikadon
16:30-17:30	*One-on-one hands-on sessions** Alessandro Miani, Roland Mühlenbernd, Jan Nikadon, Lucía Pitarch Ballesteros & Yeray Sañudo Recacha
16:45	Final discussion and closing remarks

**Time for interested participants to consult with the workshop hosts individually or further practice workshop content.*

More about the presentations

Lucía Pitarch Ballesteros & Yeray Sañudo Recacha	*Presentation of Projects and Researchers: 4D Picture and Improving Communication in Pediatric Oncology.*

This presentation will cover the backgrounds of researchers Yeray Sañudo and Lucía Pitarch, as well as the projects they are working on to improve doctor-patient communication and the patient experience in healthcare services. This will be a brief talk discussing the outlook for both projects, as well as the difficulties and challenges they address.
In addition to this presentation, a short survey will be conducted among attendees to better understand their backgrounds and perspectives on topics such as participatory design, linguistic analysis, and experience analysis.

Lucía Pitarch Ballesteros & Yeray Sañudo Recacha	*EMPATHS Workshop: Emotional Design Applied to Healthcare Services.*

This workshop will focus on explaining and promoting the EMPATHS methodology proposed by researcher Yeray Sañudo. This methodology aims to understand patients' experiences during healthcare processes from the perspective of emotional analysis and empathy.
The workshop will be divided into two parts: the first will explain the theoretical procedures, and the second will involve role-playing exercises (in groups of 3 or 4 people) to familiarize participants with the methodology.

Lucía Pitarch Ballesteros & Yeray Sañudo Recacha	*INCEpTION Workshop: Linguistic Annotation Software Applied to Medical Texts.*

This workshop will offer a guided tour through the INCEpTION software and its setup for tasks relevant to medical communication settings, such as metadata annotation, anonymization, medical named entity annotation, and the specific use case developed in the 4D Picture project: metaphor annotation.
The workshop will include a first guided demonstration on how to use INCEpTION: from uploading texts, to creating annotation layers, adding external resources to guide annotation, exploring automation options, and exporting data for further analysis in Python; followed by a second part devoted to hands-on text annotation.
Required resources: one computer per person, and internet access.

Lucía Pitarch Ballesteros & Yeray Sañudo Recacha	*LancsBoxX and Python Workshop: Introduction to Computational Linguistic Tools Applied to Medical Texts Analysis.*

Building on the texts annotated in the previous workshop, this session focuses on data analysis, introducing computational tools for different types of linguistic analysis. LancsBox X will be presented as an open-source corpus analysis tool for preliminary analysis of the data, including keyword analysis, collocation graphs, and concordance line searches. Participants will then use pre-made Python notebooks in Google Colab to access the data annotated through INCEpTION and run temporal dynamic analysis using the NetworkX Python library.
The session will begin with a presentation of results obtained in the 4D Picture project, followed by guided, hands-on coding sessions. This workshop can be attended independently of the INCEpTION workshop; sample annotated data will be provided for participants who did not attend the previous session.
Required resources: one computer per person, and internet access.

Lucía Pitarch Ballesteros & Yeray Sañudo Recacha	*Co-creation Workshop and Presentation of Project Results.*

In this final session, we will provide a brief introduction to creative processes and involve users in the search for solutions and prototyping. We will present a series of prototypes developed as part of the 4D Picture project to demonstrate how these participatory processes can generate viable and implementable solutions.
Metaphor Catalogue: A catalogue of metaphors created in collaboration with patients and healthcare professionals that helps patients better understand their cancer or the effects it has on their lives.
Patient Workbook: A tool for use during consultations and by patients themselves that improves communication during appointments and enhances patients' ability to make decisions.
Medical text adaptation tool: based on CLARA-Med project, a web tool created to adapt complex medical texts to different audiences from different ages, including children, teenagers, and parents.
At the end of the session, a brief survey will be conducted to assess the usefulness of the workshops.

Lidia Wiśniewska-Nogaj	*NLP and parenting practices*

I would like to show my grant proposal. I would like to use NLP methods to analyze voice notes and laboratory data. The use of NLP algorithms will allow for the precise, automated extraction of acoustic, structural, and emotional features from spontaneous utterances collected in participants' natural environments using Ecological Momentary Assessment (EMA). This analysis of the verbal layer will enable the capture of the real-time micro-dynamics of self-efficacy fluctuation and escalating parental burnout, bypassing the limitations of traditional self-report methods. Furthermore, applying NLP tools to structured lab data will ensure high reliability and the objective measurement of specific responses to stimuli.

Antoni Żyndul	*Linguistic markers use in depressive vs. non-depressive individuals - LIWC analysis.*

This study investigates whether linguistic markers derived from spoken clinical interview transcripts can reliably differentiate depressed from non-depressed individuals, and whether the linguistic expression of depression is moderated by gender. Using the Linguistic Inquiry and Word Count (LIWC) software, 16 theoretically motivated markers spanning emotional valence, pronoun use, and absolutist language were extracted from the Distress Analysis Interview Corpus — Wizard of Oz (DAIC-WOZ), a dataset of semi-structured interviews conducted by a virtual agent (N = 142; 42 depressed, 100 non-depressed). Independent samples tests and logistic regression were employed to address both research questions.

Partial support was found for the hypothesis that depressed and non-depressed participants differ in linguistic marker use. Anxiety, Negative Tone, and Negative Emotion were significantly elevated in the depressed sample, with medium effect sizes. Anxiety was the sole marker to reach significance across both analytical frameworks, representing the most robust finding of the study. First person singular pronoun use and absolutist word frequency — both well-documented in prior written-text research — were not replicated, likely reflecting modality effects specific to spontaneous spoken dialogue and the structured interview format. No significant differences were identified between the language of depressed women and depressed men in independent samples analyses; however, exploratory logistic regression revealed that Anxiety and Sadness were significant predictors of depression in women only, suggesting potential gender-specific linguistic profiles warranting further investigation.

These findings support the integration of linguistic marker analysis into multimodal depression detection frameworks, while highlighting the importance of data modality, corpus design, and gender as moderating factors in computational approaches to depression assessment.

Alessandro Miani	*Measuring Psychological Constructs in Text Corpora*

In this workshop, we use the Contextualized Construct Representation (CCR; https://osf.io/preprints/psyarxiv/m93pd_v1), a technique based on sentence embeddings that quantifies the semantic similarity between psychometrically validated scales and text corpora.
Unlike existing methods such as dictionaries (rigid word counts with arbitrary decisions about which words and how many) or LLM annotation (flexible but expensive, often non-reproducible, and opaque), CCR is theory-driven, interpretable, and replicable.
The workshop (2-3 hours) begins with a theoretical background and detailed method walkthrough (1 hour), followed by a practical session in which participants can work on their own research question (1-2 hours).
For the practical session, please bring:

- A research question (a hypothesis about a psychological construct in text)
- A text corpus (can be small; samples are fine)
- A validated psychometric scale (relevant to your construct)

Example research questions:

- Does pseudoscientific framing in psychology influencer content correlate with health misinformation susceptibility?

→ Corpus: Instagram reels transcribed from psychology accounts
→ Scales: Pseudoscience Mentality Scale, Bullshit Receptivity Scale, Intuition vs Evidence Scale

- Is conspiracism associated with political text polarization?

→ Corpus: Political texts labeled by ideological bias (e.g., DONALD: https://osf.io/6xpa2)
→ Scale: Conspiratorial Mentality Questionnaire (e.g., CMQ: https://doi.org/10.3389/fpsyg.2013.00225), polariziation (e.g., https://doi.org/10.1093/pnasnexus/pgac019)

- Does linguistic agency vary with social rank? (See Study 2: https://www.nature.com/articles/-s44271-023-00020-1)

→ Corpus: Social media posts aggregated by follower count or user status
→ Scales: Locus of control, sense of agency

Please have R and Python installed on your laptop (I use RStudio and PyCharm, but any IDE works).
Before the workshop downloadable materials including code and sample corpora will be provided.

Bogna Bylicka	*Word–Body Discordance: A New Multimodal Construct for Clinical Self-Report - Proof of Concept in Relational Self-Silencing*

Background: Across medicine, clinicians rely on patients' verbal reports to guide diagnosis and treatment. This dependence is particularly pronounced in psychiatry and in chronic conditions where subjective symptoms often outweigh objective findings. Yet verbal self-report does not always faithfully reflect internal experience. Through repeated invalidation, relational learning, or habitual suppression of distress, individuals may learn to minimise or conceal symptoms, creating clinically meaningful discrepancies between what is reported and what is experienced. This challenge may be particularly relevant to women's health, where many chronic conditions rely heavily on subjective symptom reporting and prolonged diagnostic pathways have been associated with experiences of symptom invalidation.

Objective: I introduce Word–Body Discordance (WBD), a novel multimodal construct describing the within-person divergence between verbal expression of subjective experience and concurrent physiological state during emotionally salient communication. We propose that WBD can be operationalised directly rather than inferred through clinical intuition alone. As a proof-of-concept, we use relational self-silencing as an experimentally tractable model of habitual suppression of internal experience. Although relational self-silencing is distinct from clinical underreporting, it provides a natural paradigm in which spoken emotional expression is expected to diverge from physiological response, enabling objective investigation of WBD.

Methods: I present CALM, an ongoing within-person study of women recruited from the community. Participants complete standardized measures of self-silencing, depression, anxiety, stress, and self-reported mental and physical health conditions, including chronic conditions common in women's health. They then, in a lab session, narrate autobiographical memories under emotionally neutral and relationally challenging conditions while EEG, ECG/HRV, electrodermal activity, and verbal narratives are simultaneously recorded. Rather than fusing these modalities into a single composite index, we quantify WBD by comparing linguistic indicators of emotional expression with concurrent physiological and acoustic markers of arousal. We test whether WBD increases during relationally challenging narratives and whether it is associated with validated measures of relational self-silencing.

Results: We present early feasibility findings from ongoing data collection demonstrating the practicality of quantifying WBD during autobiographical narrative recall.

Conclusions: WBD provides a measurable framework for investigating when verbal self-report diverges from concurrent physiological state. Relational self-silencing offers a clinically relevant proof-of-concept for this framework, laying the foundation for future studies examining WBD across psychiatry, women's health, and chronic disease management, where accurate interpretation of patient self-report is central to diagnosis and treatment.

Roland Mühlenbernd	*Pragmatic LLMs: Modeling Social Meaning Inference*

My talk looks at "social meaning inference" — how we can get models to rate things like politeness, intent, or emotional stance from what people say. I'll open with PRISMA, a chatbot I built that returns social meaning ratings, as a hands-on way into the topic. From there I'll present the methodology behind the project as a whole: how we turn human pragmatics experiments into LLM studies using the same experimental design as the original studies, and how we use LLMs themselves as annotators for the open-text reasoning.

Agnieszka Sowińska	*What Does NLP Miss When It Models Only Text? Gesture, Dyadic Asymmetry and Neurodivergent Interaction.*

Although NLP increasingly incorporates multimodal information, many approaches still model communication primarily through features of individual speakers or utterances. Drawing on preliminary findings from a multimodal corpus of peer conversations among autistic, ADHD and neurotypical university students, this presentation examines gesture frequency, gesture function and, in particular, how gestural contributions are distributed between interaction partners. The findings do not point to a single neurodivergent gesture profile. Instead, some of the clearest group differences emerge in the distribution of gestures between partners, with autistic dyads showing greater gestural asymmetry than ADHD and neurotypical dyads. Short video clips illustrate how verbal and embodied resources work together and how interactional patterns can be difficult to capture from verbal text alone. I conclude by considering how multimodal annotation and interaction-sensitive modelling might help NLP represent communication as a jointly organised process.

Jan Nikadon	*BERTAgent: Quantifying Linguistic Agency in Text*

Agency—the capacity to set goals and act upon them—is central to human cognition, mental health, and social life. Yet traditional dictionary-based approaches to measuring agency in language often overlook context, polysemy, negation, and gradations of agency.

This workshop introduces BERTAgent, a Python package based on transformer language models, fine-tuned on large lexicographic datasets and validated against human judgments. BERTAgent quantifies agency at the sentence level, distinguishing between passive and highly agentic language while accounting for semantic context and negation.

I will describe in detail the development and interdisciplinary evaluation of BERTAgent. Its development process may serve as a blueprint for creating similar tools by combining existing lexicographic datasets with deep-learning techniques to detect and quantify other psychological constructs in text. I will also demonstrate BERTAgent's application to the study of depressive symptoms in postpartum social media communication.

The workshop may include a hands-on session using Google Colab; **participants will need an internet-connected computer.**

Barbara Konat	*Modeling Persuasion in Online Communities: The PersOn Project*

The talk introduces PersOn: A Pragmatic Model of Persuasion in Online Communities project (2025–2030), funded by the Polish National Science Centre (NCN) under the SONATA BIS program. The project investigates how persuasion functions in communication in online communities. We combine theories of argumentation, pragmatics, and psychology of persuasion with Natural Language Processing to study not only what people argue, but also who communicates with whom, how interaction unfolds, and which communicative strategies contribute to persuasive success. The project develops NLP methods for modeling dialogue, social and linguistic features of online communities, and persuasive moves in large-scale natural language data, with the broader goal of building computational models of persuasion as a dynamic, socially situated process.

Oliwia Kowalczyk	*Designing for Understanding: Co-Creating and Testing Cancer Prevention Communication*

This talk will present a research programme situated at the intersection of cancer prevention, health communication, and accessibility science, drawing on the presenter's own research projects and empirical studies in this area. It will address how patient-facing materials on cancer screening and prevention can be developed and evaluated for audiences who are frequently under-served by standard health communication, including people with intellectual disabilities and other groups facing literacy or comprehension barriers. The presentation will outline a participatory, co-design approach to producing accessible, easy-read health resources involving patients, caregivers, and healthcare professionals, and will then turn to the empirical evaluation of such materials — including recent eye-tracking work comparing standard and easy-read versions of cancer-prevention texts to examine attention allocation, reading behaviour, and comprehension. Taken together, the talk will trace a research trajectory from co-design methodology to objective, gaze-based evaluation of communication effectiveness, and will discuss what is required to move from materials that are merely „readable" to materials that are demonstrably „understood".

Juan Olvido Perea García	*Why is everything "significant"? Evidence-language leakage in English news, 2007–2025.*

Significant is a distinctive word. In ordinary language it marks importance, relevance, consequence, or magnitude, while in statistics it also carries a technical inferential meaning. We examine how *significant*, *significantly*, and *significance* changed in English web news from 2007 to 2025 using more than 18 million News Crawl articles from the Conference on Machine Translation (WMT) corpus. The *significant* family increasingly appears across a broader share of articles, gains relative to semantic alternatives, and after 2020 becomes less tightly associated with nearby research/statistical vocabulary than comparable background news contexts. The findings point to a redistribution of *significant* within news discourse, raising the possibility that the technical authority attached to statistical *significance* increasingly bleeds into ordinary claims of importance, blurring the boundary between evidence and evaluation.