

INFUSE Workshop: The First Workshop on INFormation access in Uncertainty ScEnarios

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Abstract. People often encounter or seek information on issues for which no clear answer exists. For example, information may be scarce or nonexistent, as in data voids or unanswerable questions; knowledge might be evolving, as with current events, emerging topics, or rumours; or there may be multiple perspectives on an issue, particularly in the case of debated topics. We refer to these as *uncertainty scenarios*. In such scenarios, information access systems are facing different risks, like eliciting a false sense of information certainty, over-reliance, promoting mis- and disinformation, or exposing users to viewpoint-biased information.

This full-day workshop brings together researchers and practitioners focusing on information access in *scenarios of uncertainty* to engage in discussions around challenges and potential solutions. For that, we have planned a highly interactive in-person workshop programme with invited talks, roundtables, and a collaboration fair. The discussions and outcomes of the workshop will be shared in a report after the workshop.

Keywords: Information Uncertainty · Informed Citizenry.

1 Motivation and Background

Uncertainty is widely recognised as a fundamental property of information seeking [3]. Foundational theories such as Shannon's information theory define information through its ability to reduce uncertainty, making it valuable because it clarifies the state of the world [15]. Uncertainty is not an obstacle to be removed, but rather what makes information meaningful. Information would carry no importance if every outcome were known with certainty.

Despite this uncertainty, much contemporary information retrieval (IR) research does not explicitly incorporate uncertainty into its models. For example, information access systems and large language models (LLMs) are typically designed to generate or retrieve content in response to a query, but they are far

less effective at signalling when reliable information is absent. An LLM may produce a plausible-sounding answer even when there is no relevant information [23], thereby hiding rather than exposing uncertainty. This tendency reflects a broader gap in current approaches; systems are optimised for producing answers, not for communicating the limits of knowledge. This poses a particular challenge in some scenarios of information access, which are inherently marked by high levels of uncertainty. This is the case, for instance, when information is scarce, still evolving, or ambiguous and debated, such as in the following scenarios:

- **Breaking News and Emerging Topics:** For breaking news and emerging topics with actively evolving knowledge bases, the information available is often sparse and uncertain. This poses a challenge for information access systems in providing reliable information [1].
- **Data Voids:** When information is scarce and evolving, people might encounter data voids, which can be exploited easily, allowing low-quality or misleading content to surface. Such data voids often arise for strategic new terms, outdated terminology, fragmented concepts, inherently problematic queries, and also in the context of breaking news [8].
- **Rumours:** When the context of lacking information involves ambiguity, danger, or potential threat, rumours can emerge and spread as a collective sense-making mechanism [5]. Digital information environments play a central role in the process, increasing the visibility of rumours when people search for information about related incidents [6]. This cycle reinforces uncertainty and amplifies the spread of rumours, which can have significant political, economic, and social consequences [21].
- **Debated Topics:** Debated topics involve conflicting perspectives shaped by differing values and interests. Ideally, individuals engage with different viewpoints to form well-informed opinions. However, people may fall prey to confirmation bias or be misled by information access systems that present biased/incomplete information or (implicitly) support misperceptions [14].

There are serious concerns that current information access systems and the direction in which they seem to be developing pose a great risk to public knowledge and an informed citizenry, and threaten the integrity of democratic processes [10, 11, 19, 22]. In uncertainty scenarios, we would need information access systems that support exploration, critical thinking, suspended judgement, and awareness of uncertainty, rather than systems that flatten complexities and obscure uncertainty. While there are various promising technical and behavioural interventions that can address such problems [7, 13, 16], researchers and practitioners who work towards building information access systems that support users in navigating uncertainty scenarios face numerous challenges and often grapple with similar underlying conceptual, methodological, ethical, and other foundational questions. In this workshop, we aim to leverage the cross-disciplinary expertise of the workshop organisers, invited speakers, and participants to identify ways of approaching these challenges and answering these questions.

2 Workshop Goals and Objectives

The First Workshop on Information Access in Uncertainty Scenarios⁵ aims to provide a forum for the broader IR community to discuss emerging challenges, share diverse perspectives, and explore novel approaches to information access in contexts of uncertainty. Our goals are to:

- **Draw Attention to Emerging Risks:** To draw attention to emergent issues, such as issues arising from the rapid adoption and integration of LLM-enabled search services, which may lead to potentially harmful consequences.
- **Build Community:** Bring together researchers and practitioners from different backgrounds, interested in information access in uncertainty scenarios.
- **Exchange and Advance Knowledge:** Engage in structured discussions on topics and questions that are collected by the organizers prior to the workshop (see Section 3), and questions that emerge during the workshop.
- **Improve Information Access Systems:** Contribute to the development of information access systems that prioritise informed citizenries and critical thinking, and that raise awareness of the complex nuances of information.
- **Promote Collaborations:** Create spaces for researchers to discover shared interests and explore opportunities for impactful collaboration.

2.1 Topics of Interest

With the scope of the workshop centered on information access in uncertainty scenarios, our topics of interest include, but are not limited to:

- Retrieval models designed to handle information scarcity, ambiguity, and uncertainty
- Evaluation frameworks and metrics for information retrieval under uncertainty
- Techniques for query understanding in uncertainty scenarios
- Methods for detecting and safeguarding against incorrect or misleading information in uncertain or datavoid settings
- Approaches to aggregate and present information in uncertainty scenarios
- User studies investigating information behaviour, decision-making, trust, and awareness under conditions of uncertainty
- Studies on the impact and adaptation of generative AI in information access in uncertainty scenarios

3 Workshop Format and Structure

The workshop aims to build bridges across disciplines, research areas, and researchers. The format includes structured interactions and discussions among participants, speakers, and organisers to support this. The event will be held in person, with all organisers present on the day.

⁵ <https://sites.google.com/view/infuse-workshop/home>

3.1 Program

Invited Talks. The following two interdisciplinary experts on information access in uncertainty scenarios have accepted our invitation to give 45-minute talks. We will instruct the speakers to design their talks to be interactive and encourage them to participate in the full workshop day.

Philipp Lorenz-Spreen is a junior research group leader in the field of Computational Social Science at the Center Synergy of Systems at TU Dresden. He has also been conducting research at the Max Planck Institute for Human Development since completing his doctorate in theoretical physics at the TU Berlin on the dynamics of collective attention. His research focuses on how platform dynamics influence democratic discourse worldwide and what changes are needed to give agency back to users and foster a healthier public debate. His talk will promote a deeper understanding of the systemic implications of information access systems, and provide inspiration for researching and developing alternatives that support user autonomy and societal wellbeing.

Norbert Fuhr is a full Professor at the University of Duisburg-Essen since 2002, leading the Duisburg Information Engineering Group. Before this, he was an Associate Professor at the University of Dortmund, and completed his PhD in Computer Science at the Technical University of Darmstadt. In his research, he focuses on interactive and domain-specific information retrieval, and the validity of information retrieval experiments. His talk will cover that effective information retrieval must explicitly address vagueness, uncertainty, and context, which are insufficiently handled by current LLM- and RAG-based information access systems. It highlights the need for mechanisms that manage ambiguous queries, communicate answer uncertainty, and automatically capture user context beyond manual query enrichment.

Participant Submissions. Participants will be asked to submit short abstracts rather than full papers to prioritise discussion and exchange. We welcome contributions that address challenges of information access in contexts of uncertainty, focusing on human engagement with information or the design of information access systems. Relevant abstracts may also describe ongoing projects or work that has already been or will be presented elsewhere, as well as perspectives and ideas that have not yet been fully developed. The Workshop organisers will curate these submissions and share them with attendees in advance, enabling participants to review one another’s perspectives before the event. The format overview is presented in Figure 1. This approach encourages broad participation and supports ECIR’s mission of promoting diversity and inclusion. To keep the process simple and accessible, all submissions will be managed through EasyChair. For abstract presentations, we will group the abstracts by topic and organise panels of 3–5 abstracts, with the authors presenting their work and discussing it with the other panellists and the audience.

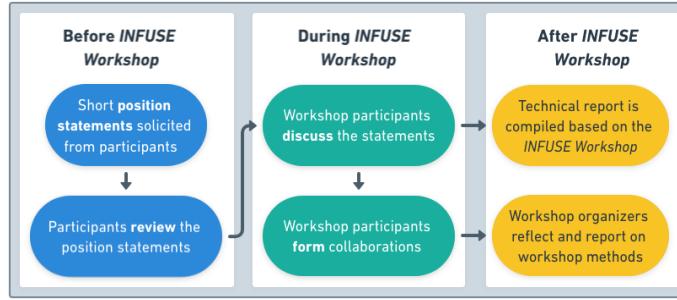


Fig. 1. *INFUSE Workshop Overview.*

Musical Tables. We will organise roundtables for different topics (e.g., system evaluation, user-centric studies, alternative system designs, theories of change). To enable fruitful interactions, the number of tables will be adapted to the number of workshop participants. Each table will be guided by an organiser who will prepare questions to stimulate the discussion. We will use screen-free collaboration methods (e.g., flip charts and moderation cards). In two musical-table sessions, participants can join different tables to learn about and share their thoughts and ideas on various topics. After the workshop, the organisers will write a report based on these discussions and outcomes.

Collaboration Fair. We will conclude the workshop on a high note with a *collaboration fair*. For that, we will give participants the opportunity to (1) find collaborators who could support their existing projects in meaningful ways, and (2) make initial plans for transforming some of the ideas that have been discussed and developed throughout the day into actual research. For (1), we will ask participants to write down the expertise they are looking for in their projects, as well as the expertise they could provide for other projects on a piece of paper. For (2), each organiser who guided a roundtable will prepare similar sheets for the project ideas discussed at their table. Participants, invited speakers, and organisers will have the opportunity to walk around, discuss the various projects, and write their email addresses on the sheets for any projects they are interested in contributing to, so that project leads and table guides can contact them after the workshop. The goal of this collaboration fair is to prevent the energy and ideas generated throughout the day from dissipating into post-workshop inertia, but instead to provide a springboard for meaningful follow-ups and continued momentum. Some time after the workshop, we will reflect on this novel method and ask for feedback from the participants. We will communicate the insights in the final report to inform future practices (see Figure 1).

Workshop Outputs and Follow-ups. We aim to publish a SIGIR Forum article on the outcomes of this workshop, written collaboratively with the par-

ticipants. This approach has been successfully used in past workshops, including recent ECIR workshops [2, 4], FACTS-IR at SIGIR 2019 [12], the Future Conversations Workshop at CHIIR 2021 [17], and the ECR’s Roundtable for Information Access Research in 2022 [18].

Time Planning. The proposed schedule is shown in Table 1.

Table 1. Proposed workshop schedule

Time	Event
09:00-09:15	Welcome and Scene Setting
09:15-10:45	Invited Speakers
10:45-11:00	Morning tea break
11:00-12:30	Selected Presentations
12:30-13:30	Lunch break
13:30-14:15	Musical Tables (Session 1)
14:15-14:45	Afternoon tea break
14:45-15:30	Musical Tables (Session 2)
15:30-16:45	Collaboration Fair
16:45-17:00	Wrap-up

3.2 Intended Audience

ECIR, as the leading European venue for IR, provides an excellent setting for bringing together researchers to consider the debate on uncertainty in information access. The workshop will engage established and early-career community members, while also welcoming perspectives from related disciplines. We will invite participants with a track record of studying scenarios of information uncertainty, such as data voids or emerging topics, and encourage others interested in exploring these challenges to join. We aim to attract contributors from academia, industry, governmental, non-governmental, and regulatory organisations. Attendance will remain open, and we will keep the participation threshold low to encourage discussion rather than one-sided presentations. We anticipate around 30 to 50 participants, consistent with similar workshops.

Encouraging Diversity. We aim to bring together a diverse group that includes established and early-career researchers, unconventional voices, and practitioners from various backgrounds. To achieve this, we will issue an open call through familiar channels, such as Slack, social media, and SIG mailing lists, and extend targeted invitations to long-standing community members, newcomers, and those returning after a period of absence. The organising committee reflects this diversity, representing a range of career stages, institutions, and research perspectives. The committee is well-connected across the IR community and

adjacent fields, which positions us to foster inclusive, cross-disciplinary discussions. This combination of diversity and strong networks makes the committee especially well-suited to host the workshop and guide its conversations.

3.3 Related Workshops

Recent workshops have examined information access research in relation to uncertainty. For example, RobustIR (SIGIR'25)⁶ focused on search systems under real-world constraints, NORMalize (CHIIR'24) emphasised considering norms and values in system design and evaluation [9], UncertaiNLP examined methods for *reasoning* about uncertainty [20], and ROMCIR (ECIR 2021–2025)⁷ addressed credibility and misinformation. While Communication Science conferences (e.g., MISDOOM⁸) and transnational knowledge hubs (e.g., EDMO⁹) support research on credibility and healthy information environments, they primarily operate in isolation from one another. The INFUSE workshop aims to combine these perspectives to advance information access systems that are robust, uncertainty-aware, and resistant to misinformation, opening new directions for both theory and practice.

4 Organisers

Alisa Rieger is a postdoctoral researcher in the Knowledge Technologies for the Social Sciences (KTS) department in GESIS. Before, she completed her PhD at TU Delft. In her research, she focuses on human information interaction, with an interest in understanding and addressing socio-technical challenges related to information access technologies. She has been on the organising teams of UMAP 2023 conference, the XAI summer school 2022, and the BHCC 2021 symposium. She has served as a reviewer for various conferences and journals, such as UMAP, CHI, SIGIR, and the Information Retrieval Research Journal.

Amir Ebrahimi Fard is a Senior Technologist in Search and Recommender Systems at Ofcom. He holds a PhD from TU Delft, where his research focused on countering rumours in online social media. Following his doctorate, he completed two years of postdoctoral research on viewpoint diversity in online platforms at Maastricht University. His expertise lies in the safety and integrity of IR mechanisms that underpin online social media platforms and search systems. Amir has served as a PC member for the LBR track at UMAP 2022 and the GMAP workshop in 2023 and 2024.

Johanne Trippas is a Vice-Chancellor's Senior Research Fellow at RMIT University, specialising in intelligent systems, digital assistants, and conversational information seeking. Their research aims to enhance information accessibility

⁶ <https://sigir-2025-workshop-on-robust-ir.github.io/>

⁷ <https://romeir.disco.unimib.it/>

⁸ <https://www.misdoom2024.uni-muenster.de/>

⁹ <https://edmo.eu/>

through conversational systems, interactive IR, and human-computer interaction. Additionally, Johanne is a member of the NIST TREC program committee and serves on the ACM CHIIR steering committee. She serves as vice-chair of the SIGIR Artifact Evaluation Committee, local arrangements chair for SIGIR'26, and program chair for ACM CHIIR'26. They have organised the ACM Conversational User Interfaces (CUI'24) conference, a TREC Track (CAsT'22), and more than 10 workshops and tutorials.

Nicolas Mattis is a postdoctoral researcher at the Amsterdam School of Communication Research and affiliated with the AI Media and Democracy Lab. He holds a PhD from Vrije Universiteit Amsterdam. His research focuses on responsible choice architecture design of digital information environments (including research on nudging, AI disclosures, literacy interventions, and fact-checking interventions). He has published in top-tier Communication Science journals and co-organised several events, including the 1st Symposium on Diversity of News Diets and its Effect on Democratic Citizenship (2025), an ICA post conference on transparent algorithmic recommendation practices (2023), an ACM workshop at RecSys 2023, and stakeholder workshops on news diversity in recommender systems.

Ran Yu (Ph.D. Computer Science) is a senior researcher in the Knowledge Technologies for the Social Sciences (KTS) department in GESIS. Her research interests are in IR, User Modeling, Knowledge Graphs, and their application to Web data analytics problems, specifically in online learning scenarios. Her work has been published in major conferences and journals, including SIGIR and ECIR; she is a member of numerous program committees such as SIGIR, ECIR, WSDM, TheWebConf, and CIKM. She has been actively involved in the organisation of academic events, such as the IWILDS workshop series, which fosters international collaboration in the field of Web-based learning.

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