

Ingo Frommholz

PhD (Dr. rer. nat.), Diplom-Inform., FBCS, FHEA

Current Position

Reader (~Associate Professor) in Data Science at the University of Wolverhampton, UK
Adjunct Professor (Lehrbeauftragter) at the Bern University of Applied Sciences, Switzerland

Summary

- Interested in Deep Learning, AI and NLP for human-centred Information Retrieval
- Founder and head of the Data Science and AI Research group at the University of Wolverhampton. Deputy director Digital Innovations and Service Centre (DISC) at the University of Wolverhampton
- PhD in Computer Science (Dr. rer. nat., summa cum laude), University of Duisburg-Essen, Germany
- Funding/PI: EU Horizon Europe MSCA Staff Exchange project OMINO on Information Overload (2023-2027, UKRI guarantee funding, total 1,550,200.00€, own part 253,000€); EU H2020 ETN QUARTZ on quantum mechanics and information retrieval (2016-2020, total 3,461,495.04€, own part 546,757.76€); Internally funded RIGHT project on deep learning for digital humanities (since 2023, GBP 612,621). PI of further smaller research and knowledge transfer projects.
- Published more than 100 refereed and unrefereed articles, preprints, reports, proceedings, books and book sections
- Treasurer and Steering Committee Member, The Chartered Institute for IT (BCS) Information Retrieval Specialist Group (BCS-IRSG)
- Senior managing editor of the International Journal on Digital Libraries (Springer)
- General Chair ACM CIKM 2023, Birmingham (Core-A-ranked conference with 750 delegates)
- Chair and (senior) programme committee member of several world-leading conferences and journals in Information Retrieval, AI and Digital Libraries
- Organiser of several international workshops (e.g., BIR, BIRNDL, BIRDS, BCS Search Solutions, FDIA) and schools (ESSIR, ASIRF)
- Course and programme co-ordinator for Computer Science, Data Science and Artificial Intelligence undergraduate and postgraduate programmes; module co-ordinator and lecturer in the UK, Germany, Switzerland, Oman and Jordan of several Computer Science topics at undergraduate and postgraduate level, such as: Information Retrieval, Machine Learning and Artificial Intelligence, Data Mining, Data Science, Cybermetrics and Statistics, Data Engineering, Databases and Data Modelling, Programming and Data Structures, Distributed Computing
- Supervised 8 PhD students to successful completion; examiner for 11 PhD candidates in the UK, Denmark, Finland, The Netherlands, Italy and Germany
- BCS Fellow (FBCS), ACM Member (SIGIR), Advance HE Fellow (FHEA)
- External examiner, University of Strathclyde, Glasgow, UK and University of Sheffield, UK

Education

- 2008 **PhD (Dr. rer. nat.) in Computer Science**, *University of Duisburg-Essen*, Duisburg, Germany
- 2001 **Diplom-Informatiker (MSc Computer Science equivalent)**, *University of Dortmund*, Germany
- 2012 **Postgraduate Certificate in Academic Practice (PgCAP)**, *University of Bedfordshire*, Luton, UK

Professional Experience

- 12/2020– Present **Reader (Associate Professor equivalent) in Data Science**, *School of Engineering, Computing and Mathematical Sciences, University of Wolverhampton*, UK
- 02/2023– Present **Adjunct Professor (Lehrbeauftragter)**, *School of Engineering and Computer Science, Bern University of Applied Sciences*, Biel/Bienne, Switzerland
- 02/2011– 11/2020 **Lecturer/Senior Lecturer**, *School of Computer Science and Technology, University of Bedfordshire*, Luton, UK

- 2012–2018 **Search and Data Science Consultant**, *Self Employed*, London, UK
- 11/2008–01/2011 **Postdoctoral Research Associate**, *Information Retrieval Group, School of Computing Science, University of Glasgow*, Glasgow, Scotland
- 10/2004–10/2008 **Research Assistant**, *Information Systems Group, Faculty of Engineering Sciences, University of Duisburg-Essen*, Duisburg, Germany
- 3/2006–4/2006 **Visiting researcher**, *Information Management Systems Research Group, University of Padua*, Italy
- 3/2001–9/2004 **Research Assistant**, *Fraunhofer Integrated Publication and Information Systems Institute (IPSI)*, Darmstadt, Germany
- 11/1994–2/2001 **Software Developer**, *Several companies: adesso GmbH, o.tel.o GmbH, Lion Ges. für Systementwicklung mbH*, Bochum, Düsseldorf, Dortmund, Germany

Selected Research and Industry Grants

Research Grants

- 2023–2026 **OMINO**, *University of Wolverhampton*, UK
EU Horizon Europe MSCA Staff Exchange project on tackling Information Overload (total worth GBP 1,342,174, own part GBP 218,036). PI.
- 2023–2025 **RIGHT – Responsible Digital Humanities Lab**, *University of Wolverhampton*, UK
Internally funded project for PhD students to work on deep learning for digital humanities (worth GBP 612,621). PI.
- 2023–2025 **LASER**, *University of Wolverhampton*, UK
Internally funded PhD project on large language models in information retrieval (worth GBP 39,000). PI.
- 2016–2020 **QUARTZ**, *University of Bedfordshire*, Luton, UK
EU H2020 Marie Curie ITN European Training Network on quantum-based information access and retrieval (worth GBP 2,996,988, own part GBP 473,387). PI.
- 2012–2013 **Rising Star**, *University of Bedfordshire*, Luton, UK
Internal Research Investment Rising Star Funding on Query Session Processing for Information Seeking and Searching (GBP 6,000). PI
- 2010–2011 **QONTEXT**, *University of Glasgow*, Glasgow, UK
EU Marie Curie FP7-IRSES project on information retrieval and quantum theory. Contributed to the successful research proposal.
- 2004–2006 **CLASSIX**, *University of Duisburg-Essen*, Duisburg, Germany
German Research Foundation (DFG) project on classification and intelligent search on information in XML. PI.

KTP and Industry Grants

- 2016–2019 **Drax Technology Ltd**, *University of Bedfordshire*, Luton, UK
Innovate UK Knowledge Transfer Partnership with Drax Technology on Internet of Things, machine learning and intelligent fire alarms (worth GBP 134,752). Lead academic and PI.
- 2012–2018 **NotActivelyLooking.com**
Private consultancy project on the design and implementation of a search engine for executives (in collaboration with industry partners). PI and main software developer.
- 2016–2017 **Wardown Park Talking Objects**, *University of Bedfordshire*, Luton, UK
Digital Humanities KTP project combining augmented reality and conversational information retrieval (Luton Cultural Services Trust, GBP 18,971). PI.
- 2015 **EduVocation**, *University of Bedfordshire*, Luton, UK
Teacher recruitment site and information system based on linked open data (UK Innovation Voucher, GBP 5,000). PI.
- 2013–2015 **Luton Culture World War I project**, *University of Bedfordshire*, Luton, UK
Digital Museum and Linked Data project on World War I in conjunction with Luton Museum (UK Lottery Fund, GBP 16,000, PI).
- 2006 **KIIB**, *University of Duisburg-Essen*, Duisburg, Germany
EU-EUREGIO project on business processes and email classification, in collaboration with d.velop AG, Gescher, Germany. PI.

Further Research Projects: EDISON (University of Bedfordshire): EU H2020 Coordination and Support Action to accelerate the creation of Data Science profession; RENAISSANCE (University of Glasgow): EPSRC project on retrieval models based on the quantum theory framework; LACOSTIR (University of Duisburg-Essen): DFG project on interactive retrieval; DELOS (University of Duisburg-Essen): EU-FP6 Network of Excellence on Digital Libraries; BRICKS (Fraunhofer IPSI):

EU-FP6 integrated project on distributed resources for integrated cultural knowledge services; VIP-ADVISOR (Fraunhofer IPSI): EU-FP5 project (IST-2001-32440) on a virtual advisor for personal insurance and finance risk management; COL-LATE (Fraunhofer IPSI): EU-FP5 project (IST-1999-20882) on the development of a collaboratory for annotation, indexing and retrieval of digitized historical archive material; SCHOLNET (Fraunhofer IPSI): EU-FP5 project (IST-1999-20664) on a digital library infrastructure for supporting communication and collaboration among networked scholarly communities.

Further Knowledge Transfer Projects: SOLVD (University of Wolverhampton): EU European Regional Development Fund to support SMEs in the adoption of digital technologies; CRASH (University of Bedfordshire): Cyber Risk Assessment of Stalking and Harassment.

Selected Publications

Published more than 100 refereed and unrefereed articles, preprints, reports, proceedings, books and book sections. A selection can be found here.

- [1] Janusz A. Hołyst, Philipp Mayr, Michael Thelwall, Ingo Frommholz, Shlomo Havlin, Alon Sela, Yoed N. Kenett, Denis Helic, Aljoša Rehar, Sebastijan R. Maček, Przemysław Kazienko, Tomasz Kajdanowicz, Przemysław Biecek, Boleslaw K. Szymanski, and Julian Sienkiewicz. Protect our environment from information overload. *Nature Human Behaviour*, pages 1–2, February 2024. Publisher: Nature Publishing Group.
- [2] Julius Odede and Ingo Frommholz. JayBot – Aiding University Students and Admission with an LLM-based Chatbot. In *Proceedings ACM SIGIR Conference on Human Information Interaction And Retrieval (CHIIR 2024)*, pages 391–395. ACM, 2024.
- [3] Patrick Steinert, Stefan Wagenpfeil, Paul Mc Kevitt, Ingo Frommholz, and Matthias Hemmje. Parallelization Strategies for Graph-Code-Based Similarity Search. *Big Data and Cognitive Computing*, 7(2):70, April 2023.
- [4] Karen Chessum, Haiming Liu, and Ingo Frommholz. An Extended Study of Search User Interface Design Focused on Hofstede’s Cultural Dimensions. In Andreas Holzinger, Hugo Plácido Da Silva, Jean Vanderdonckt, and Larry Constantine, editors, *Computer-Human Interaction Research and Applications*, volume 1882, pages 130–152, Cham, 2023. Springer Nature Switzerland. Series Title: Communications in Computer and Information Science.
- [5] Kanishka Silva and Ingo Frommholz. What if ChatGPT wrote the Abstract? - Explainable Multi-Authorship Attribution with a Data Augmentation Strategy. In *Proceedings of the IACT - The 1st International Workshop on Implicit Author Characterization from Texts for Search and Retrieval (IACT@SIGIR 2023)*, pages 38–48, Taipei, Taiwan, 2023. CEUR-WS.org.
- [6] Nicholas Collis and Ingo Frommholz. Crowdsourced Linked Data Question Answering with AQUACOLD. In *Proceedings of the ACM/IEEE Joint Conference on Digital Libraries (JCDL 2021)*. ACM, 2021.
- [7] Amit Kumar Jaiswal, Haiming Liu, and Ingo Frommholz. Semantic Hilbert Space for Interactive Image Retrieval. In *ICTIR 2021 - Proceedings of the 2021 ACM SIGIR International Conference on Theory of Information Retrieval*, pages 307–315, 2021.
- [8] Amit Kumar Jaiswal, Haiming Liu, and Ingo Frommholz. Utilising Information Foraging Theory for User Interaction with Image Query Auto-Completion. In *Proceedings European Conference on Information Retrieval (ECIR 2020)*. Springer, 2020.
- [9] Ingo Frommholz and Thomas Roelleke. Scalable DB+IR Technology: Processing Probabilistic Datalog with HySpirit. *Datenbank-Spektrum*, 16(1):39–48, 2016.
- [10] Muhammad Kamran Abbasi and Ingo Frommholz. Cluster-based Polyrepresentation as Science Modelling Approach for Information Retrieval. *Scientometrics*, 102(3):2301–2322, 2015.
- [11] Zinnar Ghasem, Ingo Frommholz, and Carsten Maple. Machine Learning Solutions for controlling Cyberbullying and Cyberstalking. *Journal of Information Security Research*, 6(2):55–64, 2015.
- [12] Ingo Frommholz, Benjamin Piwowarski, Mounia Lalmas, and Keith van Rijsbergen. Processing Queries in Session in a Quantum-Inspired IR Framework. In Paul Clough, Colum Foley, Cathal Gurrin, Gareth J F Jones, Wessel Kraaij, Hyowon Lee, and Vanessa Mudoch, editors, *Advances in Information Retrieval*, volume 6611, pages 751–754. Springer, 2011. Series Title: Lecture Notes in Computer Science.
- [13] Dawei Song, Mounia Lalmas, Keith van Rijsbergen, Ingo Frommholz, Benjamin Piwowarski, Jun Wang, P Zhang, Guido Zuccon, Peter Bruza, Sachi Arafat, Leif Azzopardi, Alvaro Huertas-Rosero, Y Hou, Massimo Melucci, and Stefan Rüger. How Quantum Theory is Developing the Field of Information Retrieval. In *Proceedings Quantum Interaction 2010*, October 2010.
- [14] Benjamin Piwowarski, Ingo Frommholz, Mounia Lalmas, and Keith Van Rijsbergen. Exploring a Multidimensional Representation of Documents and Queries. In *Proceedings of the 9th RIAO Conferences (RIAO 2010)*, Paris, France, June 2010. University of Glasgow, Department of Computing Science. arXiv: 1002.3238v1.
- [15] Benjamin Piwowarski, Ingo Frommholz, Yashar Moshfeghi, Mounia Lalmas, and Keith van Rijsbergen. Filtering documents with subspaces. In *Proceedings of the 32nd European Conference on Information Retrieval (ECIR 2010)*, pages 615–618, January 2010.
- [16] Ingo Frommholz, Birger Larsen, Benjamin Piwowarski, Mounia Lalmas, Peter Ingwersen, and Keith Van Rijsbergen. Supporting Polyrepresentation in a Quantum-inspired Geometrical Retrieval Framework. In Paul Clough, Colum Foley, Cathal Gurrin,

- Gareth J. F. Jones, and Wessel Kraaij, editors, *IliX '10: Proceedings of the third symposium on Information Interaction in Context (IliX 2010)*, pages 115–124. ACM, 2010.
- [17] Erik Graf, Ingo Frommholz, Mounia Lalmas, and Keith van Rijsbergen. Knowledge Modeling in Prior Art Search. In Hamish Cunningham, Allan Hanbury, and Stefan Rüger, editors, *Proceedings of the First Information Retrieval Facility Conference, IRFC 2010*, volume 6107, pages 31–46, Berlin, Heidelberg, 2010. Springer Berlin Heidelberg. Series Title: Lecture Notes in Computer Science.
- [18] Benjamin Piwowarski, Ingo Frommholz, Mounia Lalmas, and Keith van Rijsbergen. What can Quantum Theory bring to Information Retrieval? In *CIKM '10: Proceedings of the 19th ACM International Conference on Information and Knowledge Management*, pages 59–68, 2010.
- [19] Ingo Frommholz. Annotation-based Document Retrieval with Probabilistic Logics. In Norbert Fuhr, Laszlo Kovacs, and Carlo Meghini, editors, *Research and Advanced Technology for Digital Libraries. Proc. of the 11th European Conference on Digital Libraries (ECDL 2007)*, pages 321–332, Heidelberg et al., September 2007. Springer. Series Title: Lecture Notes in Computer Science.
- [20] Ingo Frommholz and Norbert Fuhr. Probabilistic, Object-oriented Logics for Annotation-based Retrieval in Digital Libraries. In Michael Nelson, Cathy Marshall, and Gary Marchionini, editors, *Proc. of the 6th ACM/IEEE Joint Conference on Digital Libraries (JCDL 2006)*, pages 55–64, New York, 2006. ACM.
- [21] P. Knežević, B. Mehta, C. Niederée, T. Risse, U. Thiel, and I. Frommholz. Supporting information access in next generation digital library architectures. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, volume 3664 LNCS, pages 207–222, 2005. ISSN: 03029743 16113349.
- [22] Maristella Agosti, Nicola Ferro, Ingo Frommholz, and Ulrich Thiel. Annotations in Digital Libraries and Collaboratories – Facets, Models and Usage. In Rachel Heery and Liz Lyon, editors, *Research and Advanced Technology for Digital Libraries. Proc. European Conference on Digital Libraries (ECDL 2004)*, pages 244–255, Heidelberg et al., 2004. Springer. Series Title: Lecture Notes in Computer Science.
- [23] Marcello L'Abbate, Ingo Frommholz, Ulrich Thiel, and Erich Neuhold. Using Case Based Retrieval Techniques for Handling anomalous Situations in Advisory Dialogues. In Fernando Galindo, Makoto Takizawa, and Roland Traunm Ller, editors, *Proceedings of the 15th International Conference on Database and Expert Systems Application (DEXA 2004)*, pages 539–548, 2004.
- [24] Ulrich Thiel, Holger Brocks, Ingo Frommholz, Andrea Dirsch-Weigand, Jürgen Keiper, Adelheit Stein, and Erich Neuhold. COLLATE - A Collaboratory Supporting Research on Historic European Films. *International Journal on Digital Libraries (IJDL)*, 4(1):8–12, 2004. Series Number: 1.
- [25] Ingo Frommholz. Categorizing Web Documents in Hierarchical Catalogues. In *23rd European Colloquium on Information Retrieval Research (ECIR 2001)*, March 2001.