

ECONLP-AI 2022 – 4th Workshop on Economics, Natural Language Processing and Artificial Intelligence

Call for Contribution:

After the successful launch of the *Economics and Natural Language Processing* (ECONLP) workshop at ACL 2018 in Melbourne, Australia (<https://www.aclweb.org/anthology/W18-31.pdf>), and the follow-up events at EMNLP-IJCNLP 2019 in Hong Kong, China (<https://www.aclweb.org/anthology/D19-5100.pdf>) and EMNLP 2021 in Punta Cana, Dominican Republic (hybrid, also as a virtual event) (<https://biblio.ugent.be/publication/8728637/file/8728638.pdf>), we intend to run the fourth edition of ECONLP by strengthening the ties to the artificial intelligence community at its top-tier international conference, IJCAI-ECAI 2022, in Vienna, Austria.

ECONLP-AI addresses the increasing relevance of NLP for regional, national and international economy, both in terms of already operational language technology products and systems, and newly emerging methodologies and techniques reflecting the requirements at the intersection of economics, artificial intelligence, and NLP. The focus of the workshop will be on how natural language understanding influences business relations and procedures, economic transactions, and the roles of human and computational actors involved in commercial activities. Particular emphasis will be given this year to its ties to AI, e.g., in terms of forecasting/prediction models, reasoning styles adequate for the economic domain, such as uncertain, causal or temporal reasoning, trust modeling and fraud/deception analysis, building and maintaining economic knowledge graphs, social networking and emotion analytics, organizational intelligence and learning, and virtual economic software agents (traders, mediators, counselors, etc.). Papers submitted to this workshop should address:

- NLP-based (stock) market analytics, e.g., prediction of economic performance indicators (trend prediction, performance forecasting, etc.), by analyzing verbal statements of enterprises, businesses, companies, and associated legal or administrative actors
- NLP-based product analytics, e.g., based on social and mass media monitoring, summarizing reviews, classifying and mining complaint messages and other (non)verbal types of customer reactions to products or services
- NLP-based customer analytics, e.g., client profiling, tracking product/company preferences, screening customer reviews or complaints, identifying high-influentials (peers) in economy-related communication networks
- NLP-based organization/enterprise analytics (e.g., tracing and pro-actively altering social images of organizational actors, risk prediction, fraud analysis, predictive analysis of annual business, sustainability and auditing reports, prospectuses, etc.)
- NLP-based analysis of macro-economic phenomena in which national economies and the (inter)national banking system (IMF, Fed, PBoC, ECB) play an influential role
- Analysis of market sentiments and emotions as evident from consumers' and enterprises' verbal behavior traces and their communication strategies about products, services or market performance
- Competitive intelligence services based on NLP and AI tooling
- Relationships and interactions between quantitative (structured) economic data (e.g., those available from sales databases and associated time series data, log data) and qualitative (unstructured verbal) economic data (press releases, newswire streams, social media channels, etc.)
- Organizational information management based on the content-based organization, packaging and archiving of verbal communication streams of organizations and enterprises (emails, meeting minutes, business letters, internal reporting, etc.)

- Credibility and trust models for business agents involved in the economic process (e.g., as traders, sellers, advertisers) extracted from text/opinion mining their communication behavior (including historic or legacy data)
- Deception or fake information recognition related to economic objects (such as products, advertisements, etc.) or economic actors (such as industries, companies, etc.), including opinion spam targeting or emanating from economic actors and processes
- Impression management of brands (brand management) or people
- Economic reasoning styles: uncertain, causal, temporal, mixed numeric/(sub)symbolic, qualitative, etc.
- Verbally fluent software agents (chat bots for counseling, sales and marketing) as virtual actors in economic processes serving business interests, e.g., embodying models of persuasion, information biases, fair trading, incl. economic software agents/multi-agent systems and their theoretical underpinnings (game theory, auction models, utility theory, preference models, social choice theory, protocols, etc.)
- Integrated economic data and text mining
- Enterprise search engines (e-commerce, e-marketing) involving NLP and AI analytics
- Consumer search engines, market monitors, product/service recommender systems involving NLP and AI analytics
- Client-supplier interaction platforms (e.g., portals, helps desks, newsgroups) and transaction support systems based on written or spoken natural language communication
- Multi-media and multi-modality interaction platforms, including written/spoken language channels, triggering or supporting economic processes
- Specialized modes of information extraction and text mining in economic domains, e.g., temporal event or transaction mining, timeline construction
- Information aggregation from multiple economy-related single sources (e.g., review summaries, automatic threading of discussions)
- Text generation in economic domains, e.g., review generation, complaint response generation
- Ontologies and knowledge graphs for economics and adaptation of general-domain lexicons for economic NLP
- Corpora and annotation policies (guidelines, metadata schemata, etc.) for economic NLP
- Economy-specific text genres (business reports, sustainability reports, auditing documents, product reviews, economic newswire, business letters, prospectuses, etc.) and their usage for NLP (e.g., classification, filtering, etc.)
- Dedicated, domain-adapted software resources for economic NLP (e.g., NER taggers, sublanguage parsers, pipelines or domain-adapted end-to-end systems for processing economic discourse), including pre-trained economic language models

Preliminary Workshop Format:

ECONLP 2022 will be organized as a 1.5 day workshop – the first day will be devoted to paper presentations, the second half-day will present the results of the shared task. The shared task will focus on two novel subtasks: event extraction and sentiment analysis from economic texts. The task will build on the newly published SENTIEVENT text corpus (Jacobs & Hoste, 2021). We plan for two invited talks and a panel session on the ties between NLP, economics, and AI.

The first day will have a brief introduction to the workshop theme and on-going initiatives, and then continue in 1.5 hour blocks with paper presentations and an invited talk. A morning coffee/tea break, lunch break and an afternoon coffee/tea break will split the four up to five sessions. The second half-day will report on the outcome of the shared task, with papers from the top-performing systems, plus the second invited talk.

Estimate of the audience size: 30-50 attendees

Tentative List of PC Members:

- Sven Büchel Friedrich-Schiller-Universität Jena, Jena, Germany
- David Carmel Amazon, Haifa, Israel
- Michael Chau University of Hong Kong, Hong Kong, China
- Paulo Cortez University of Minho, Guimarães, Portugal
- Sanjiv Ranjan Das Santa Clara University, Santa Clara, CA, USA
- Brian Davis Dublin City University, Dublin, Ireland
- Luciano Del Corro Goldman Sachs, Frankfurt/M., Germany
- Lipika Dey Tata Consultancy Services (TCS) Innovation Lab, New Delhi, India
- Giuseppe Di Fabbriuzio VUI, Inc., Boston, MA, USA & Trento, Italy
- Flavius Frasinca Erasmus University, Rotterdam, The Netherlands
- Anjan Goswami Adobe Inc., San Francisco, CA, USA
- Petr Hájek University of Pardubice, Pardubice, Czech Republic
- Yulan He University of Warwick, Coventry, UK
- Qing Li Southwestern University of Finance and Economics, Chengdu, China
- Xiaodong Li Hohai University, Nanjing, Jiangsu, China
- Pekka Malo Aalto University, Aalto, Finland
- Igor Mozetič Jožef Stefan Institute, Ljubljana, Slovenia
- Viktor Pekar Aston University, Birmingham, UK
- Nicolas Pröllochs Universität Gießen, Gießen, Germany
- Samuel Rönqvist University of Turku, Turku, Finland
- Hiroki Sakaji University of Tokyo, Tokyo, Japan
- Kazuhiro Seki University of Kobe, Kobe, Japan
- Sameena Shah JPMorgan Chase, New York City, NY, USA
- Kiyooki Shirai Japan Advanced Institute of Science and Technology (JAIST), Nomi, Japan
- Heiner Stuckenschmidt Universität Mannheim, Mannheim, Germany
- Jacopo Tagliabue Coveo Labs, New York City, NY, USA
- Mengting Wan Microsoft, Redmond, WA, USA
- Frank Z. Xing Nanyang Technological University, Singapore, Singapore
- Wlodek Zadrozny University of North Carolina, Charlotte, NC, USA
- Zhu (Drew) Zhang Iowa State University, Ames, IA, USA

Thematically Related Workshops:

- [3rd] **Workshop on Financial Technology and Natural Language Processing** [@ IJCAI 2021]
- [2nd] **Workshop on Financial Technology and Natural Language Processing** [@ IJCAI-PRICAI 2020]
- [1st] **Workshop on Financial Technology and Natural Language Processing** [@ IJCAI 2019]
 - Narrowly focused on FinTech – ECONLP has a much wider thematic scope and deeper integrates NLP and AI topics
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- **eCOM – eCommerce** @ SIGIR 2017, 2018, 2019, 2020, 2021
 - Narrowly focused on e-commerce in the context of IR – ECONLP has a much wider thematic scope and integrates NLP and AI topics
- **ECNLP – e-Commerce & NLP** @ WWW 2019, WWW 2020, ACL 2020, ACL 2021
 - Narrowly focused on e-commerce in the context of NLP – ECONLP has a much wider thematic scope and integrates NLP and AI topics
- **FNP – Financial Narrative Processing** @ LREC 2018, NoDaLiDa 2019, COLING 2020, U Lancaster 2021
 - Focused on NLP only – ECONLP has a wider thematic scope and integrates NLP and AI topics
- Single workshops @ KDD and NeurIPS dealing with **ADF – Anomaly Detection in Finance** (KDD 2017 & 2019), **MLF – ML in Finance** (KDD 2020 & 2021), as well as **Robust AI in Financial Services** (NeurIPS 2019), **FAIF – Fair AI in Finance** (NeurIPS 2020), and **MLECON – ML Meets Econometrics** (NeurIPS 2021)
 - Focused on ML, econometrics, and even more specialized themes, without any relation to NLP – ECONLP has an alternative thematic scope and integrates NLP and AI topics

Previous ECONLP workshops:

1st ECONLP 2018 Workshop @ ACL 2018, Melbourne, Australia

(<https://www.aclweb.org/anthology/W18-31.pdf>)

- a. Submissions received: 16
- b. Papers accepted: 8 [2 long, 6 short]
- c. Number of attendees: 40

2nd ECONLP 2019 Workshop @ EMNLP-IJCNLP 2019, Hong Kong, China

(<https://www.aclweb.org/anthology/D19-5100.pdf>)

- a. Submissions received: 17
- b. Papers accepted: 8 [5 long, 3 short]
- c. Number of attendees: 50

3rd ECONLP 2021 Workshop @ EMNLP 2021, Punta Cana, Dominican Republic (+ virtual)

(<https://biblio.ugent.be/publication/8728637/file/8728638.pdf>)

- a. Submissions received: 16
- b. Papers accepted: 12 [5 long, 7 short]
- c. Number of attendees: 50

Members of the Organizing Committee:

- **Udo Hahn (chair)** Friedrich-Schiller-Universität Jena, Germany udo.hahn@uni-jena.de
- Véronique Hoste Ghent University, Belgium veronique.hoste@ugent.be
- Gerard Hoberg University of Southern California, CA, USA hoberg@marshall.usc.edu

Organizers' CVs, Areas of Expertise, and Experience in Organizing Workshops:

- **Udo Hahn** – Jena University Language & Information Engineering (JULIE) Lab, Friedrich-Schiller-Universität Jena, Germany (chair) - **primary contact for the OC**
<https://julielab.de/Staff/Hahn>

Udo Hahn is a full professor for Computational Linguistics at FSU Jena (Germany) where he heads the Jena University Language & Information Engineering (JULIE) Lab (www.julielab.de). He holds a PhD from the Information Science Department at the University of Konstanz (Germany). His research interests focus on NLP applications for the life and natural sciences, mainly information extraction and text mining, emotion analysis, knowledge integration and aggregation from structured and unstructured data (incl. text summarization), annotation science, ontology and multilingual terminology engineering, as well as software engineering for NLP. He already co-organized 12 workshops in total. Among them six workshops for ACL (the 1st ECONLP workshop @ ACL 2018, 2nd ECONLP workshop @ EMNLP-IJCNLP 2019, and 3rd ECONLP workshop @ EMNLP 2021, workshops on Automatic Summarization @ ANLP-NAACL 2000 and ACL 2002, and the BioNLP 2002 workshop @ ACL 2002), and the “UIMA for NLP” workshops @ LREC 2008 and LREC 2010.

Relevant Publications:

Buechel, Sven, & Rücker, Susanna, & **Hahn, Udo** (2020). Learning and evaluating emotion lexicons for 91 languages. In: *ACL 2020 – Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, 1202-1217.

Buechel, Sven, & Junker, Simon, & Schlaak, Thore, & Michelsen, Claus, & **Hahn, Udo** (2019). A time series analysis of emotional loading in Central Bank statements. In: *ECONLP 2019 – Proceedings of the 2nd Workshop on Economics and Natural Language Processing @ EMNLP-IJCNLP 2019*, 16–21.

Händschke, Sebastian G. M., & Buechel, Sven, & Goldenstein, Jan, & Poschmann, Philipp, & Duan, Tinghui, & Walgenbach, Peter, & **Hahn, Udo** (2018). A corpus of corporate annual and social responsibility reports: 280 million tokens of balanced organizational writing. In: *ECONLP 2018 – Proceedings of the 1st Workshop on Economics and Natural Language Processing @ ACL 2018*, 20-31.

Buechel, Sven, & **Hahn, Udo**, & Goldenstein, Jan, & Händschke, Sebastian G. M., & Walgenbach, Peter (2016). Do enterprises have emotions? In: *WASSA 2016 – Proceedings of the 7th Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis @ NAACL-HLT 2016*, 147-153.

Buechel, Sven, & **Hahn, Udo** (2016). Emotion analysis as a regression problem: dimensional models and their implications on emotion representation and metrical evaluation. In: *ECAI 2016 – Proceedings of the 22nd European Conference on Artificial Intelligence*, 1114-1122.

- **Véronique Hoste** – LT3 Language and Translation Technology Group, Ghent University, Belgium
<https://research.flw.ugent.be/en/veronique.hoste>

Prof. Veronique Hoste is Full Professor of Computational Linguistics and director of the LT3 Language and Translation Technology Team at Ghent University (www.lt3.ugent.be). She holds a PhD in computational linguistics from the University of Antwerp on optimization issues in machine learning of coreference resolution (2005). She has a strong expertise in machine learning of natural language, and more specifically in coreference resolution, word sense disambiguation, terminology extraction, text classification, classifier optimization, readability prediction, sentiment mining, economic event extraction and (implicit) sentiment analysis. She co-organized different workshops, including the 1st ECONLP workshop @ ACL 2018, 2nd ECONLP workshop @ EMNLP-IJCNLP 2019, and 3rd ECONLP workshop @ EMNLP 2021,, as well as shared tasks on coreference resolution (2010), cross-lingual word sense disambiguation (2010 and 2013), L2 writing (2014), and multilingual aspect-based sentiment analysis (2016).

Relevant Publications:

Jacobs, Gilles, & **Hoste, Véronique** (2021). SENTiVENT: enabling supervised information extraction of company-specific events in economic and financial news. In: *Language Resources and Evaluation* [pub ahead of print: <https://link.springer.com/article/10.1007/s10579-021-09562-4>]

Jacobs, Gilles, & **Hoste, Véronique** (2021). Fine-grained implicit sentiment in financial news: uncovering hidden bulls and bears. In: *electronics*, 10, #2554.

Jacobs, Gilles, & **Hoste, Véronique** (2020). Extracting fine-grained economic events from business news. In: *Proceedings of the 1st Joint Workshop on Financial Narrative Processing and Multiling Financial Summarisation @ COLING 2020*, 235–245.

Jacobs, Gilles, & Lefever, Els, & **Hoste, Véronique** (2018). Economic event detection in company-specific news text. In: *ECONLP 2018 – Proceedings of the 1st Workshop on Economics and Natural Language Processing @ ACL 2018*, 1–10.

Lefever, Els, & **Hoste, Véronique** (2016). A classification-based approach to economic event detection in Dutch news text. In: *LREC 2016 – Proceedings of the 10th International Conference on Language Resources and Evaluation*, 330-335

- **Gerard Hoberg** – University of Southern California, CA, USA, USA
<http://faculty.marshall.usc.edu/Gerard-Hoberg/>

Gerard Hoberg is a Charles E. Cook Community Bank Professor of Finance at USC, CA, USA. His research interest include corporate finance, industrial organization, IPOs, M&A, payout policy, risk management, and empirical asset pricing.

Relevant Publications:

Hoberg, Gerard, & Phillips, Gordon (2018). Text-based industry choice and product language. In: *Management Science*, 64, 3735-3755.

Hoberg, Gerard, & Phillips, Gordon (2018). Text-based industry momentum. In: *Journal of Financial and Quantitative Analysis*, 53, 2355-2388.

Hoberg, Gerard, & Lewis, Craig (2017). Do fraudulent firms produce abnormal disclosure? In: *Journal of Corporate Finance*, 43, 58-85.

Hoberg, Gerard, & Phillips, Gordon (2016). Text-based network industries and endogenous product differentiation. In: *The Journal of Political Economy*, 124, 1423–1465.

Hoberg, Gerard, & Maksimovic, Vojislav (2015). Redefining financial constraints: a text-based analysis. In: *The Review of Financial Studies*, 28, 1312-1352.

Efforts made to ensure demographic, geographic and academic diversity of the organizers and speakers:

- Gender diversity: 1 female organizer (VH), 2 male (UH, GH)
- Geographic diversity: 2 organizers from Europe (UH, VH), 1 from the US (GH)
- Academic diversity: 2 organizers from NLP (UH, VH), 1 from economics (GH)

Accessible @ <https://julielab.de/econlp/2022/ECONLP-2022-Proposal.pdf>