DELMAS MAXIME

Postdoctoral Researcher

My research interests focus on Information Extraction and Retrieval to synergize Language Models and biomedical Knowledge Graphs, to enable the automatic exploitation of biomedical knowledge, from the design of new hypotheses to the interpretation of experimental data. With a solid background in application-oriented research, gained through two industrial projects as a principal investigator, I aim to balance my focus toward more fundamental questions, particularly by integrating bibliometric analyses and meta-analyses of the literature and scientific knowledge.

CONTACT

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Switzerland

0000-0002-9352-0624

LANGUAGES

French (native)

English - Fluent

REFERENTS

André Freitas (Idiap, Manchester University)
andre.freitas@manchester.ac.uk

Fabien Jourdan (INRAE ToxAlim)
fabien.jourdan@inrae.fr

Clément Frainay (INRAE ToxAlim)
clement.frainay@inrae.fr

EDUCATION

PhD in Bioinformatics
INRAE ToxAlim | 2019 - 2022

Master of Bioinformatics, Modeling and Statistics
Normandie University | 2016 - 2019

Licence Biochemistry, Cellular and Molecular Biology, Physiology
Normandie University | 2015 - 2016

2 years' undergraduated studies in Bioinformatics
University Clermont 1 | 2013 - 2015

EXPERIENCE

Postdoctoral Researcher

Idiap, Martigny, Switzerland | 2022 - present

- ***Project ABROAD** (10/2022 - 03/2024): Development of an NLP tool for selecting the potential sources of novel antibiotic active against multiresistant microbes.*
- ***Project MAVERICK** (01/2024 - 03/2026): Maximum evidence platform for explainable predictions of risk related to climate change.*

Fields and skills: Language Models, Semantic Web, Ontologies, Knowledge Graphs, Information Retrieval, Information Extraction, Machine Learning, Deep Learning.

PhD student

INRAE ToxAlim, Toulouse, France | 2019 - 2022

Subject: Compilation, prediction and qualification of relationships between chemical compounds and pathologies using scientific literature and Knowledge Graphs
Fields and skills: Semantic Web, Knowledge Graphs, Bayesian statistics, Network analysis

Apprenticeship in bioinformatics

UMR 5088 CNRS, Toulouse, France | 2017 - 2019

Subject: Development of a circular RNAs and very long intergenic non coding RNAs detection workflow.

SKILLS

Semantic Web and Knowledge Graphs: RDF, OWL, SPARQL, Neo4J
Natural Language Processing: Pretrained models, Information Retrieval and Extraction, fine-tuning of Transformer-based models, synthetic data generation, vector databases.
Machine Learning & Deep Learning: PyTorch, Transformers, Peft, Langchain.
Software engineering: Python (NLP), R (statistics), Github/Gitlab, Hydra, W&B, Docker, SLURM, Jupyter.
Modelisation of biological systems.
Network analysis (random walks, centrality measures)

CONTRIBUTIONS

Publications

- Delmas, M. et al. Relation Extraction in underexplored biomedical domains: A diversity-optimised sampling and synthetic data generation approach. *Computational Linguistics (2024)*
- Wysocka, M. et al. Large Language Models, scientific knowledge and factuality: A systematic analysis in antibiotic discovery. *Journal of Biomedical Informatics (2024)*
- Cooke, J. et al. Genome scale metabolic network modelling for metabolic profile predictions. *PLOS Computational Biology (2024)*
- Wysocka, O. et al. An LLM-based Knowledge Synthesis and Scientific Reasoning Framework for Biomedical Discovery. *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics - Volume 3: System Demonstrations (2024)*
- Delmas, M. et al. Suggesting disease associations for overlooked metabolites using literature from metabolic neighbors. *GigaScience (2023)*

HOBBIES

piano

Hiking

Winter sports

- Delmas, M. et al. FORUM: building a Knowledge Graph from public databases and scientific literature to extract associations between chemicals and diseases. *Bioinformatics (2021)*
- Muniz, L. et al. Circular ANRIL isoforms switch from repressors to activators of p15/CDKN2B expression during RAF1 oncogene-induced senescence. *RNA Biology (2021)*

Oral communications

- Language Models for Relation Extraction,
  Webinar Metaprogramme DIGIT-BIO, online. 05 Mars 2024
- SSD GOS5: Impact of Large Language Models in the biomedical domain.
  Webinar SSD GOS5, online. 09 November 2023
- FORUM: Knowledge Graph (KG) for semantic representation and inference of relations between chemicals and biomedical concepts.
  JOBIM 2022, Rennes. 05-08 July 2022
- FORUM: a Knowledge Graph to decipher associations between metabolites and diseases.
  Metabolomics Society Conference, Valencia, Spain. 19-23 June 2022

Posters

- Expanding FORUM Knowledge Graph with link suggestion for overlooked compounds.
  JOBIM 2022, Rennes. 05-08 July 2022
- FORUM: Building a Knowledge Graph from public databases and scientific literature to extract associations between chemicals and diseases.
  Metabolomics Society Conference. Virtual conference. 22-24 June 2021
- FORUM: Supporting metabolomics interpretations using literature and Knowledge Graphs.
  E*URION cluster annual meeting. Virtual conference. 28-29 January 2021*
- A comparison of different approaches to estimate disease similarities.
  JOBIM 2020. Virtual conference. 30 June - 03 July 2020
- A set of methods to study three classes of non-coding RNAs
  JOBIM 2019, Nantes. 02-05 July 2019

TEACHING / SUPERVISING EXPERIENCE

- Summer School Multi-omics Data Analysis and Integration. Results contextualisation - An introduction to metabolic models, Semantic Web and Knowledge Graphs.
  Aussois, France | 03/09/2023 - 08/09/2023
- Practical courses: Graph databases, Metabolic networks analysis
  Toulouse Master in Bioinformatics | 07/12/2021
- Supervision of a master student internship | 03/2022 - 08/2022

  Subject: Application of text-mining/NLP methods on scientific literature for the qualification of chemical compounds - diseases associations.

LICENCES / CERTIFICATIONS

Machine Learning by Stanford Online - Coursera
(*Crediential ID EXZQWTMM7EAV*)

Specialization Natural language Processing by deeplearning.ai - Coursera
(*Crediential ID YDQ2X6UWPEPQ*)

AWARDS

Student Travel Award
Metabolomics Society Conference, Valencia, Spain. 19-23 June 2022