

# NICHOLAS HARLEY, Ph.D.

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## ACADEMIC

- 2019 - Pres Postdoc Artificial Intelligence**  
Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, BE  
Member of the AI Lab specialising in Human-Like AI and Computational Creativity
- 2014 - 2019 PhD Computer Science**  
Queen Mary University of London, Mile End Road, London, E1 4NS, UK  
AHRC scholarship with the Transforming Musicology project specialising in knowledge representation and reasoning for computational musicology.  
Thesis *Abstract Representation of Music: A Type-Based Knowledge Representation Framework*: Explored using dependent type theory as a basis for KR languages.
- 2013 - 2014 MSc Sound and Music Computing**  
Universitat Pompeu Fabra, Roc Boronat 138, 08018 Barcelona, ES  
Covered the core elements of music technology and research including digital signal processing, music information retrieval, machine learning and computational modelling.  
Thesis *Evaluation of Set-Class Similarity Measures for Tonal Analysis*: Descriptive modelling of tonality using PC-set theory. Exploring the practical applications of abstract theoretical models within MIR and wider music research.
- 2007 - 2011 MEng (Hons 2.1) Electrical and Electronic Engineering**  
University College London, Gower Street, London, WC1E 6BT, UK  
Covered a wide range of fundamental topics through a mixture of theory and practical demonstrations including laboratory work and group coursework.  
4th Year Thesis *Passive Surveillance Using Software-Defined Radio*: Employed a cutting edge approach to develop a successful product prototype. Created a platform for future research using emerging technology, specifically the USRP2 from Ettus.  
3rd Year Thesis *Advanced-Super-View Pixel Modelling*. Used custom software to simulate the performance of new LCD technologies. Gained experience of data analysis.

## PUBLICATIONS

- In Progress** Harley, N. & Wiggins, G. A. (2022). Common Hierarchical Abstract Knowledge Representation for Anything: Integration and reasoning with heterogeneous knowledge sources using dependent type theory.
- In Progress** Harley, N. & Wiggins, G. A. (2022). Abstract representation of musical knowledge for collaborative scholarship.
- In Progress** Wiggins, G. A., Homer, S., Harley, N. & Loro Velardo, F. (2022). A new approach to oscillatory representations of percepts and sequential abstract predictive knowledge in music. *Journal*

of Cognition.

- 2021** Carnovalini, F., Harley, N., Homer, S. T., Rodà, A. & Wiggins, G. A. (2021). Meta-Evaluating Quantitative Internal Evaluation: A Practical Approach for Developers. In *Proceedings of the 12th International Conference on Computational Creativity (ICCC '21)*, (pp. 213-217).
- 2021** Carnovalini, F., Rodà, A., Harley, N., Homer, S. T. & Wiggins, G. A. (2021). A new corpus for computational music research and a novel method for musical structure analysis. In *Audio Mostly 2021 (AM '21)*. Association for Computing Machinery, New York, NY, USA, (pp. 264–267).
- 2021** Carnovalini, F., Harley, N., Homer, S. T., Rodà, A. & Wiggins, G. A. (2021). Studying Structural Regularities through Abstraction Trees. In *Proceedings of the 15th International Symposium on CMMR*, (p. 165).
- 2019** Beuls, K., Bogaerts, B., Bontempi, G., Geurts, P., Harley, N., Lebichot, B., ... & Van Eecke, P. (2019). *Proceedings of the 31st Benelux Conference on Artificial Intelligence (BNAIC 2019) and the 28th Belgian Dutch Conference on Machine Learning (Benelearn 2019)*.
- 2019** Harley, N. (2020). *Abstract representation of music: A type-based knowledge representation framework* (Doctoral dissertation, Queen Mary University of London)
- 2015** Harley, N., & Wiggins, G. (2015). An ontology for abstract, hierarchical music representation. In *Late Breaking Demos, 16th International Society for Music Information Retrieval Conference (ISMIR 2015)*, Malaga, Spain (p. 12).
- 2010** James, R., Willman, E., Harley, N., Day, S. E., & Fernández, F. A. (2010, May). 48.4: Advanced-Super-View Pixel Modeling. In *SID Symposium Digest of Technical Papers* (Vol. 41, No. 1, pp. 728-731). Oxford, UK: Blackwell Publishing Ltd.

## TEACHING

- 2019 - Pres** **Computational Creativity**, Teaching assistant  
Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, BE
- 2019 - 2022** **Information Retrieval**, Teaching assistant  
Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, BE
- 2019 - Pres** **Masters Students** Thesis project advisor  
Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, BE
- 2014 - 2015** **Artificial Intelligence**, Teaching assistant  
Queen Mary University of London, Mile End Road, London, E1 4NS, UK

## CORE COMPETENCIES & INTERESTS

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| Scientific | Broad theoretical and technical training in digital signal processing, knowledge representation and reasoning, and machine learning. |
| Music      | Keen interest in music technology, computational creativity and music cognition.   |
| Computer   | Experience with a wide variety of languages including Python, Julia and Haskell.   |
| General    | Strong analytic capabilities in problem solving and data handling. Organised and cooperative style of working.                       |
| Languages  | English (Native), Spanish (Intermediate), Dutch (Beginner)   |