

CURRICULUM VITAE

Bernhard Haslhofer

Lead Research Group Cryptofinance
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Education

- 03/2004 - 11/2008 **Doctoral studies in Computer Science**, *University of Vienna, Austria*, passed with distinction. Investigated a novel Web-based mapping mechanism for bridging structural and semantic heterogeneities in the Web of Data.
- 11/2003 - 12/2005 **Master in Information & Knowledge Management**, *Vienna University of Technology, Austria*, passed with distinction. Database and Knowledge Representation Technologies, Process Modeling, Project- and Business Management.
- 10/1998 - 11/2003 **Diploma in Economics and Computer Science**, *Vienna University of Technology, Austria*. Financial Engineering and Information System Security.

Work Experience

- 08/2021 - Ongoing **R&D Lead and Co-Founder**, *Iknai Cryptoasset Analytics GmbH*. Investigation and implementation of novel cryptoasset analytics techniques.
- 01/2021 - Ongoing **Lead CryptoFinance Research Group**, *Complexity Science Hub Vienna*. Lead of research aiming at understanding and managing emerging financial technologies and paradigms like Decentralized Finance (DeFi) protocols and services.
- 09/2019 - Ongoing **External Lecturer**, *TU Vienna*. Master's level course *VU Cryptoasset Analytics*.
- 05/2020 - 04/2022 **Thematic Coordinator Data Science**, *AIT Austrian Institute of Technology, Competence Unit Data Science & Artificial Intelligence*. Scientific lead of AIT's Data Science research field. Supervision of students and scientists.
- 11/2016 - 04/2020 **Senior Scientist**, *AIT Austrian Institute of Technology*. Research and development in the area of cryptoasset analytics. Predictive modeling in industrial data science use cases. Analysis of large-scale historic text corpora. Acquisition and coordination of several research grants.
- 11/2013 - 11/2016 **Scientist**, *AIT Austrian Institute of Technology*. Supported establishment of data science research group. Applied data science methods (machine learning, text mining, information retrieval) for gaining new insights from large-scale, financial transaction graphs. **Paternity leave** from 03/2014 until 05/2016.
- 03/2013 - 02/2014 **Postdoctoral Associate / Marie-Curie Return Phase**, *Multimedia Information Systems Group, University of Vienna, Austria*. Research in the area of open data, concentrating on (i) open data systems and infrastructures, (ii) quality issues in open data networks, and (iii) human factors in open data systems.
- 03/2011 - 02/2013 **Postdoctoral Associate / Lecturer / Marie-Curie Fellow**, *Information Science Department, Cornell University, USA*. Co-designed and developed ResourceSync (ANSI/NISO Z39.99-2017) and W3C Open Annotation standards.
- 12/2008 - 02/2011 **Assistant Professor (non-tenure track)**, *Department of Distributed and Multimedia Systems, University of Vienna, Austria*. Research on data interoperability in Web environments. Active participation in the W3C Linking Open Data Community project.
- 03/2007 - 12/2008 **Research Assistant**, *Department of Distributed and Multimedia Systems, University of Vienna, Austria*. Research in the area of metadata interoperability in distributed, heterogeneous, and autonomous multimedia data sources.

02/2004 – 02/2007 **Junior Researcher**, *Austrian Research Centers (ARC), Austria*. Research and development in various H2020 projects.

Publications

In Preparation / Submission

Bernhard Haslhofer, Rainer Stütz, Matteo Romiti, and Ross King. Graphsense: A general-purpose cryptoasset analytics platform. *Arxiv pre-print*, 2021. URL <https://arxiv.org/abs/2102.13613>.

Jürgen E. Schatzmann and Bernhard Haslhofer. Bitcoin trading is irrational! an analysis of the disposition effect in bitcoin. *Arxiv pre-print*, 2020. URL <https://arxiv.org/abs/2010.12415>. Submitted for review.

Refereed Conference Papers

Matteo Romiti, Friedhelm Victor, Pedro Moreno-Sanchez, Peter Sebastian Nordholt, Bernhard Haslhofer, and Matteo Maffei. Cross-layer deanonymization methods in the lightning protocol. In *Financial Cryptography and Data Security (FC)*, 2021. URL <https://arxiv.org/abs/2007.00764>. Accepted for publication.

Anahid Jalali, Alexander Schindler, Bernhard Haslhofer, and Andreas Rauber. Machine learning interpretability techniques for outage prediction: A comparative study. *PHM Society European Conference*, 5, 2020. doi: 10.36001/phme.2020.v5i1.1244. URL <https://www.phpapers.org/index.php/phme/article/view/1244>.

Rainer Stütz, Peter Gaži, Bernhard Haslhofer, and Jacob Illum. Stake shift in major cryptocurrencies: An empirical study. In *Financial Cryptography and Data Security*, pages 97–113, Kota Kinabalu, Sabah, Malaysia, 2020. doi: 10.1007/978-3-030-51280-4_7. URL <https://arxiv.org/abs/2001.04187>.

Jan Rörden, Doris Gruber, Martin Krickl, and Bernhard Haslhofer. Identifying historical travelogues in large text corpora using machine learning. In *iConference 2020*, Borås, Sweden, 2020. doi: 10.1007/978-3-030-43687-2_67. URL <https://arxiv.org/abs/2001.01673>. Best Paper Award.

Sami Ben Mariem, Pedro Casas, Matteo Romiti, Benoit Donnet, Rainer Stütz, and Bernhard Haslhofer. All that glitters is not bitcoin – unveiling the centralized nature of the BTC (IP) network. In *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, 2020. doi: 10.1109/NOMS47738.2020.9110354. URL <https://arxiv.org/abs/2001.09105>.

Masarah Paquet-Clouston, Matteo Romiti, Bernhard Haslhofer, and Tomas Chavat. Spams meet cryptocurrencies: Sextortion in the bitcoin ecosystem. In *ACM conference on Advances in Financial Technologies (AFT)*, Zurich, Switzerland, 2019. doi: 10.1145/3318041.3355466. URL <https://arxiv.org/abs/1908.01051>.

Matteo Romiti, Aljosha Judmayer, Alexei Zamyatin, and Bernhard Haslhofer. A deep dive into bitcoin mining pools: An empirical analysis of mining shares. In *18th Annual Workshop on the Economics of Information Security (WEIS)*, Boston, USA, 2019. URL <https://arxiv.org/abs/1905.05999>.

Anahid Jalali, Clemens Heistracher, Alexander Schindler, Bernhard Haslhofer, Tanja Nemeth, Robert Glawar, Wilfried Sihm, and Peter De Boer. Predicting time-to-failure of plasma etching equipment using machine learning. In *IEEE International Conference on Prognostics and Health Management*, 2019. URL <https://arxiv.org/abs/1904.07686>.

Abraham Hinteregger and Bernhard Haslhofer. An empirical analysis of monero cross-chain traceability. In *Financial Cryptography and Data Security (FC)*, 2019. doi: 10.1007/978-3-030-32101-7_10. URL <https://arxiv.org/abs/1812.02808>.

- Tanja Nemeth, Fazel Ansari, Wilfried Sihm, Bernhard Haslhofer, and Alexander Schindler. Prima-x: A reference model for realizing prescriptive maintenance and assessing its maturity enhanced by machine learning. *Procedia CIRP: 51st CIRP Conference on Manufacturing Systems*, 72:1039 – 1044, 2018. ISSN 2212-8271. doi: 10.1016/j.procir.2018.03.280. URL <http://www.sciencedirect.com/science/article/pii/S2212827118304566>.
- Erwin Filtz, Axel Polleres, Roman Karl, and Bernhard Haslhofer. Evolution of the bitcoin address graph. In Peter Haber, Thomas Lampoltshammer, and Manfred Mayr, editors, *Data Science – Analytics and Applications*, pages 77–82, Wiesbaden, 2017. Springer Fachmedien Wiesbaden. ISBN 978-3-658-19287-7. doi: 10.1007/978-3-658-19287-7_11. URL https://doi.org/10.1007/978-3-658-19287-7_11s.
- Elaheh Momeni Roochi, Ke Tao, Bernhard Haslhofer, and Geert-Jan Houben. Identification of useful user comments in social media: A case study on flickr commons. In *ACM/IEEE Joint Conference on Digital Libraries (JCDL 2013)*, Indianapolis, USA, 7 2013. ACM. doi: 10.1145/2467696.2467711. URL <http://eprints.cs.univie.ac.at/3724/>. Best Student Paper Award Nominee.
- Bernhard Haslhofer, Werner Robitza, Carl Lagoze, and Francois Guimbretiere. Semantic tagging on historical maps. In *ACM Web Science 2013*, Paris, France, 5 2013a. ACM. doi: 10.1145/2464464.2464506. URL <http://eprints.cs.univie.ac.at/3684/>.
- Bernhard Haslhofer, Simeon Warner, Carl Lagoze, Martin Klein, Robert Sanderson, Michael L Nelson, and Herbert van de Sompel. Resourcesync: Leveraging sitemaps for resource synchronization. In *WWW 2013, WWW 2013 Companion*, Rio de Janeiro, 5 2013b. ACM. URL <http://eprints.cs.univie.ac.at/3683/>.
- Christian Mader and Bernhard Haslhofer. Perception and relevance of quality issues in web vocabularies. In *I-SEMANTICS 2013*, Graz, Austria, 2013. URL <http://eprints.cs.univie.ac.at/3720/>.
- Simeon Warner, Todd Carpenter, Bernhard Haslhofer, Martin Klein, Nettie Legace, Carl Lagoze, Peter Murray, Michael Nelson, Robert Sanderson, and Herbert van de Sompel. Resourcesync: Web-based resource synchronization. In *The 7th International Conference on Open Repositories (OR2012)*, Edinburgh, 7 2012. URL <http://eprints.cs.univie.ac.at/3460/>.
- Christian Mader, Bernhard Haslhofer, and Antoine Isaac. Finding quality issues in SKOS vocabularies. In Panayiotis Zaphiris, George Buchanan, Edie Rasmussen, and Fernando Loizides, editors, *Theory and Practice of Digital Libraries (TPDL 2012)*, Germany, 5 2012. doi: 10.1007/978-3-642-33290-6_25. URL https://doi.org/10.1007/978-3-642-33290-6_25.
- Bernhard Haslhofer and Antoine Isaac. data.europeana.eu - the europeana linked open data pilot. In *DCMI International Conference on Dublin Core and Metadata Applications*, The Hague, The Netherlands, 7 2011. URL <http://eprints.cs.univie.ac.at/2919/>.
- Rainer Simon, Bernhard Haslhofer, Werner Robitza, and Elaheh Momeni Roochi. Semantically augmented annotations in digitized map collections. In *ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, Ottawa, Canada, 6 2011. ACM. URL <http://eprints.cs.univie.ac.at/2840/>.
- Niko Popitsch and Bernhard Haslhofer. Dsnotify: Handling broken links in the web of data. In *Nineteenth International WWW Conference (WWW2010)*, Raleigh, NC, USA, 2 2010. ACM. doi: <https://doi.org/10.1145/1772690.1772768>. URL <http://eprints.cs.univie.ac.at/81/>.
- Bernhard Schandl and Bernhard Haslhofer. The sile model: A semantic file system infrastructure for the desktop. In *6th European Semantic Web Conference (ESWC2009)*, Hersonissos, Crete, 6 2009. Springer. URL <http://eprints.cs.univie.ac.at/158/>.
- Robert Hecht and Bernhard Haslhofer. Joining the bricks network - a piece of cake. In *The International EVA Conference*, Moscow, Russia, 12 2005. URL <http://eprints.cs.univie.ac.at/742/>.
- Bernhard Haslhofer and Robert Hecht. Metadata management in a heterogeneous digital library. In *eChallenges 2005*, Ljubljana, Slovenia, 10 2005. IOS Press. URL <http://eprints.cs.univie.ac.at/758/>.

Refereed Journal Articles

- Sherif Sakr, Angela Bonifati, Hannes Voigt, Alexandru Iosup, Khaled Ammar, Renzo Angles, Walid Aref, Marcelo Arenas, Maciej Besta, Peter A. Boncz, Khuzaima Daudjee, Emanuele Della Valle, Stefania Dumbrava, Olaf Hartig, Bernhard Haslhofer, Tim Hegeman, Jan Hidders, Katja Hose, Adriana Iamnitchi, Vasiliki Kalavri, Hugo Kapp, Wim Martens, M. Tamer Özsu, Eric Peukert, Stefan Plantikow, Mohamed Ragab, Matei R. Ripeanu, Semih Salihoglu, Christian Schulz, Petra Selmer, Juan F. Sequeda, Joshua Shinnavier, Gábor Szárnyas, Riccardo Tommasini, Antonino Tumeo, Alexandru Uta, Ana Lucia Varbanescu, Hsiang-Yun Wu, Nikolay Yakovets, Da Yan, and Eiko Yoneki. The future is big graphs: A community view on graph processing systems. *Commun. ACM*, 64(9):62–71, 8 2021. ISSN 0001-0782. doi: 10.1145/3434642. URL <https://doi.org/10.1145/3434642>.
- Michael Fröwis, Thilo Gottschalk, Bernhard Haslhofer, Christian Rückert, and Paulina Pesch. Safeguarding the evidential value of forensic cryptocurrency investigations. *Forensic Science International: Digital Investigation*, 2020. ISSN 2666-2817. doi: 10.1016/j.fsidi.2019.200902. URL <http://www.sciencedirect.com/science/article/pii/S1742287619302567>.
- Masarah Paquet-Clouston, Bernhard Haslhofer, and Benoît Dupont. Ransomware payments in the bitcoin ecosystem. *Journal of Cybersecurity*, 5(1), 05 2019. ISSN 2057-2085. doi: 10.1093/cybsec/tyz003. URL <https://doi.org/10.1093/cybsec/tyz003>.
- Bernhard Haslhofer, Robert Sanderson, Rainer Simon, and Herbert van de Sompel. Open annotations on multimedia web resources. *Multimedia Tools and Applications*, 70(2):847–867, 2014. doi: 10.1007/s11042-012-1098-9. URL <http://eprints.cs.univie.ac.at/3360/>.
- Elaheh Momeni, Bernhard Haslhofer, Ke Tao, and Geert-Jan Houben. Sifting useful comments from flickr commons and youtube. *International journal on Digital Libraries*, 16:161–179, 2014. doi: 10.1007/s00799-014-0123-1. URL <http://dx.doi.org/10.1007/s00799-014-0123-1>.
- Antoine Isaac and Bernhard Haslhofer. Europeana linked open data — data.europeana.eu. *Semantic Web*, 4(3):291–297, 6 2013. URL <http://eprints.cs.univie.ac.at/3732/>.
- Antoine Isaac, Robina Clayphan, and Bernhard Haslhofer. Europeana: Moving to linked open data. *Information Standards Quarterly*, 24(2/3), 9 2012. URL <http://eprints.cs.univie.ac.at/3489/>.
- Niko Popitsch and Bernhard Haslhofer. Dsnotify - a solution for event detection and link maintenance in dynamic datasets. *Web Semantics: Science, Services and Agents on the World Wide Web*, 9(3):266–283, 9 2011. URL <http://eprints.cs.univie.ac.at/2863/>.
- Bernhard Schandl, Bernhard Haslhofer, Tobias Bürger, Andreas Langeegger, and Wolfgang Halb. Linked data and multimedia: The state of affairs. *Multimedia Tools and Applications*, 59(2):523–556, 2 2011. URL <http://eprints.cs.univie.ac.at/114/>.
- Bernhard Haslhofer and Bernhard Schandl. Interweaving oai-pmh data sources with the linked data cloud. *Int. J. Metadata, Semantics and Ontologies*, 1(5):17–31, 3 2010. URL <http://eprints.cs.univie.ac.at/73/>.
- Bernhard Haslhofer and Wolfgang Klas. A survey of techniques for achieving metadata interoperability. *ACM Computing Surveys*, 42(7):1–37, 2 2010. doi: 10.1145/1667062.1667064. URL <http://eprints.cs.univie.ac.at/79/>.
- Bernhard Schandl and Bernhard Haslhofer. Files are siles: Extending file systems with semantic annotations. *International journal on Semantic Web and Information Systems (IJSWIS)*, 6(3):1–21, 2010. URL <http://eprints.cs.univie.ac.at/2240/>.
- Bernhard Haslhofer, Wolfgang Jochum, Ross King, Christian Sadilek, and Karin Schellner. The LEMO annotation framework: weaving multimedia annotations with the web. *International journal on Digital Libraries*, 10(1):15–32, 5 2009. doi: 10.1007/s00799-009-0050-8. URL <http://eprints.cs.univie.ac.at/165/>.

Refereed Workshop Papers

- Bernhard Haslhofer Jan Rörden, Artem Revenko and Andreas Blumauer. Network-based knowledge graph assessment. In *Proceedings of the Posters and Demos Track of the 13th International Conference on Semantic Systems (SEMANTiCS)*, Amsterdam, Netherlands, 2017. URL <http://ceur-ws.org/Vol-2044/paper12>.
- Flávio Martins, Bernhard Haslhofer, and João Magalhães. Query expansion using open web-based SKOS vocabularies. In *ACM SIGIR Workshop on Health Search & Discovery (HSD 2013)*, Dublin, Ireland, 7 2013. URL https://www.researchgate.net/publication/282328359_Query_Expansion_using_open_Web-based_SKOS_Vocabularies.
- Elizabeth L Murnane, Bernhard Haslhofer, and Carl Lagoze. Reslve: Leveraging user interest to improve entity disambiguation on short text. In *Web of Linked Entities (WoLE) Workshop, co-located with WWW2013*, Rio de Janeiro, 5 2013. URL <http://eprints.cs.univie.ac.at/3688/>. Best paper award.
- Bernhard Haslhofer, Flávio Martins, and João Magalhães. Using SKOS vocabularies for improving web search. In *Web of Linked Entities (WoLE) Workshop, co-located with WWW 2013*, Rio de Janeiro, 5 2013. URL <http://eprints.cs.univie.ac.at/3689/>.
- Bernhard Haslhofer, Rainer Simon, Robert Sanderson, and Herbert van de Sompel. The open annotation collaboration (OAC) model. In *Workshop on Multimedia on the Web 2011*, Graz, Austria, 9 2011. IEEE. URL <http://eprints.cs.univie.ac.at/2871/>.
- Christian Mader and Bernhard Haslhofer. Quality criteria for controlled web vocabularies. In *International Conference on Theory and Practice of Digital Libraries 2011, NKOS Workshop*, Berlin, Germany, 8 2011. URL <http://eprints.cs.univie.ac.at/2923/>.
- Rainer Simon, Bernhard Haslhofer, and Joachim 6g. Annotations, tags & linked data. In *6th International Workshop on Digital Technologies in Cartographic Heritage*, Netherlands, 4 2011. URL <http://eprints.cs.univie.ac.at/2849/>.
- Bernhard Haslhofer and Rainer Simon. Historic map annotations with yuma. In *Open Annotation Collaboration, Phase II Workshop*, Chicago, USA, 3 2011. URL <http://eprints.cs.univie.ac.at/2838/>.
- Rainer Simon, Christian Sadilek, Joachim Korb, Matthias Baldauf, and Bernhard Haslhofer. Tag clouds and old maps: Annotations as linked spatiotemporal data in the cultural heritage domain. In *Workshop On Linked Spatiotemporal Data, held in conjunction with the 6th International Conference on Geographic Information Science (GIScience 2010)*, Zurich, Switzerland, 9 2010. URL <http://eprints.cs.univie.ac.at/34/>.
- Bernhard Haslhofer, Elaheh Momeni Roochi, Manuel Gay, and Rainer Simon. Augmenting europeana content with linked data resources. In *Proceedings of the 6th International Conference on Semantic Systems (SEMANTICS 2010)*, pages 1–3, Graz, Austria, 9 2010. ACM. URL <http://eprints.cs.univie.ac.at/26/>.
- Niko Popitsch, Bernhard Haslhofer, and Elaheh Momeni Roochi. An evaluation approach for dynamics-aware applications using linked data. In *9th International Workshop on Web Semantics (WebS), co-located with DEXA 2010*, Linz, Austria, 8 2010. URL <http://eprints.cs.univie.ac.at/36/>.
- Christian Sadilek, Rainer Simon, and Bernhard Haslhofer. Service orchestration for linking open data: Applying a SOA principle to the web of data. In *1st International Workshop on Recent Trends in SOA Based Information Systems (RTSOABIS 2010)*, Funchal, Madeira, Portugal, 6 2010. URL <http://eprints.cs.univie.ac.at/49/>.
- Bernhard Haslhofer and Niko Popitsch. Dsnotify: Detecting and fixing broken links in linked data sets. In *8th International Workshop on Web Semantics (WebS 09), co-located with DEXA 2009*, Berlin, Heidelberg, 8 2009. Springer. URL <http://eprints.cs.univie.ac.at/142/>.

- Bernhard Haslhofer and Bernhard Schandl. The OAI2LOD server: Exposing OAI-PMH metadata as linked data. In *International Workshop on Linked Data on the Web (LDOW2008), co-located with WWW 2008*, Beijing, China, 4 2008. URL <http://eprints.cs.univie.ac.at/284/>.
- Bernhard Haslhofer. Uniform sparql access to interlinked (digital library) sources. In *The 6th European Networked Knowledge Organization Systems (NKOS) Workshop*, Budapest, Hungary, 9 2007. URL <http://eprints.cs.univie.ac.at/394/>.
- Bernhard Haslhofer. A service oriented architecture for integrating metadata from heterogeneous digital libraries. In *The 1st International Workshop on Semantic Information Integration on Knowledge Discovery (SIK 2006)*, Yogyakarta, Indonesia, 12 2006. URL <http://eprints.cs.univie.ac.at/584/>.
- Sebastian Kruk, Bernhard Haslhofer, Piotr Piotrowski, Adam Westerski, and Tomasz Woroniecki. The role of ontologies in semantic digital libraries. In *The 5th European Networked Knowledge Organization Systems (NKOS) Workshop*, Alicante, Spain, 9 2006. URL <http://eprints.cs.univie.ac.at/531/>.
- Sonja Zillner, Werner Winiwarter, and Bernhard Haslhofer. The design and implementation of a query algebra for multimedia meta objects. In *4th International Workshop on Web Semantics (WebS)*, Copenhagen, Denmark, 5 2005. IEEE Computer Society Press. URL <http://eprints.cs.univie.ac.at/723/>.

Books / Refereed Book Chapters

- Bernhard Haslhofer, Antoine Isaac, and Rainer Simon. *Knowledge Graphs in the Libraries and Digital Humanities Domain*, pages 1–8. Springer International Publishing, 2018. ISBN 978-3-319-63962-8. doi: 10.1007/978-3-319-63962-8_291-1. URL https://doi.org/10.1007/978-3-319-63962-8_291-1.
- Bernhard Haslhofer and Erich J. Neuhold. A retrospective on semantics and interoperability research. In Dieter Fensel, editor, *Foundations for the Web of Information and Services*, pages 3–27. Springer, Berlin Heidelberg, 7 2011. URL <http://eprints.cs.univie.ac.at/2921/>.
- Bernhard Haslhofer. *Mappings in the Web of Data: A Web-based Mapping Technique for Establishing Metadata Interoperability*. Südwestdeutscher Verlag für Hochschulschriften, Saarbrücken, 4 2009. URL <http://eprints.cs.univie.ac.at/174/>.
- Bernhard Haslhofer. The bricks digital library infrastructure. In Sebastian R. Kruk and Bill McDaniel, editors, *Semantic Digital Libraries*, pages 153–164. Springer, 10 2008. URL <http://eprints.cs.univie.ac.at/313/>.
- Bernhard Haslhofer. Context and current metadata standards (short entry). In Borko Furth, editor, *Encyclopedia of Multimedia*, pages 123–124. Springer Science, Business Media, Inc, 1 2006. URL <http://eprints.cs.univie.ac.at/608/>.

Refereed Conference Posters

- Bernhard Haslhofer, Roman Karl, and Erwin Filtz. O bitcoin where art thou? insight into large-scale transaction graphs. In *Joint Proceedings of the Posters and Demos Track of the 12th International Conference on Semantic Systems (SEMANTiCS 2016)*, Leipzig, Germany, 2016. URL <http://ceur-ws.org/Vol-1695/paper20.pdf>.
- Bernhard Haslhofer, Keith Newman, Amanda Stefanik, Werner Robitza, and Carl Lagoze. Old maps and open data networks. In *iConference 2013*, Fort Worth, TX, USA, 2 2013. URL <http://eprints.cs.univie.ac.at/3682/>.
- Bernhard Haslhofer. The SciLink project: from document-centric to resource-oriented publications. In *iConference '12*, iConference '12, pages 567–568, Toronto, ON, Canada, 2 2012. ACM. URL <http://eprints.cs.univie.ac.at/3354/>.

Rainer Simon, Joachim 6g, and Bernhard Haslhofer. The YUMA media annotation framework. In *TPDL 2011, Research and Advanced Technology for Digital Libraries*, pages 434–437, Berlin Heidelberg, 9 2011. Springer. URL <http://eprints.cs.univie.ac.at/3104/>.

Christian Mader, Bernhard Haslhofer, and Niko Popitsch. The meketrepository - middle kingdom tomb and artwork descriptions on the web. In Stefan Gradmann, Francesca Borri, Carlo Meghini, and Heiko Schuldt, editors, *Theory and Practice of Digital Libraries (TPDL 2011)*, pages 449–452”, Berlin, Heidelberg, 3 2011. Springer. URL <http://eprints.cs.univie.ac.at/2868/>.

Bernhard Haslhofer. The mediaspaces mapping framework - a web-based approach for establishing metadata interoperability (poster). In *6th European Semantic Web Conference (ESWC 2009)*, Hersonissos, Crete, 6 2009. URL <http://eprints.cs.univie.ac.at/159/>.

Philipp Nußbaumer and Bernhard Haslhofer. CIDOC CRM in action - experiences and challenges. In László Kovács, Norbert Fuhr, and Carlo Meghini, editors, *11th European Conference on Research and Advanced Technology for Digital Libraries (ECDL07)*, Lecture Notes in Computer Science (LNCS 4675), pages 532–533, Budapest, Hungary, 9 2007. Springer Berlin, Heidelberg. URL <http://eprints.cs.univie.ac.at/403/>.

Technical Reports

Bernhard Haslhofer, Simeon Warner, Carl Lagoze, Martin Klein, Robert Sanderson, Herbert van de Sompel, and Michael L Nelson. Web synchronization simulations using the resourcesync framework. Technical report, University of Vienna, Vienna, 6 2013. URL <http://eprints.cs.univie.ac.at/3725/>.

Bernhard Haslhofer, Elaheh Momeni Roochi, Bernhard Schandl, and Stefan Zander. Europeana RDF store report. Technical report, University of Vienna, Vienna, 3 2011. URL <http://eprints.cs.univie.ac.at/2833/>.

Philipp Nussbaumer, Bernhard Haslhofer, and Wolfgang Klas. Towards model implementation guidelines for the CIDOC conceptual reference model. Technical report, University of Vienna, 6 2010. URL <http://eprints.cs.univie.ac.at/58/>.

Mirjam Keßler, Maximilian Schwarzmaier, and Bernhard Haslhofer. Umfragereport zur nutzung von metadaten. Technical report, KIM - Kompetenzzentrum Interoperable Metadaten, 2 2008. URL <http://eprints.cs.univie.ac.at/296/>.

Bernhard Haslhofer. A comparative study of mapping solutions for enabling metadata interoperability. Technical report, University of Vienna, 2 2008. URL <http://eprints.cs.univie.ac.at/295/>.

Philipp Nussbaumer and Bernhard Haslhofer. Putting the CIDOC CRM into practice - experiences and challenges. Technical report, University of Vienna, 9 2007. URL <http://eprints.cs.univie.ac.at/404/>.

Magazine Contributions

Martin Klein, Robert Sanderson, Herbert van de Sompel, Simeon Warner, Bernhard Haslhofer, Carl Lagoze, and Michael L. Nelson. A technical framework for resource synchronization. *D-Lib Magazine*, 19 (1), 1 2013. doi: doi:10.1045/january2013-klein. URL <http://www.dlib.org/dlib/january13/klein/01klein.html>.

Herbert van de Sompel, Robert Sanderson, Martin Klein, Michael Nelson, Bernhard Haslhofer, Simeon Warner, and Carl Lagoze. A perspective on resource synchronization. *D-Lib Magazine*, 18(9/10), 10 2012. URL <http://www.dlib.org/dlib/september12/vandesompel/09vandesompel.html>.

Academic Theses

Bernhard Haslhofer. *A Web-based Mapping Technique for Establishing Metadata Interoperability*. PhD thesis, 11 2008. URL <http://eprints.cs.univie.ac.at/307/>.

Bernhard Haslhofer. *Agent-based electronic markets — a look behind the scenes*. Master's thesis, University of Vienna, 2003.

Teaching Activities

- Since 2019 **Cryptoasset Analytics**, (*Technical University of Vienna*), instructor: The goal of this course is to learn how crypto asset ecosystems can be analyzed using a variety of data science methods and how gained insights can subsequently be used for informed decision making. The course will offer the opportunity to design and develop novel approaches for a number of analytics use cases.
- Since 2017 **Globally-connected Systems**, (*University of Applied Sciences — FH Technikum Wien*), instructor: The goal of this course is to introduce the design principles and technologies for building global information, data, and financial networks, show the practical applications of such systems, and discuss their design and their social and policy context.
- 2015 - 2017 **Application Development in Media Informatics** (*University of Vienna*), instructor: An undergraduate course involving development of an application related to media informatics.
- Spring 2014 **Technology Applications** (*University of Salzburg*), instructor: A masters-level course introducing technologies for building data-centric Web information systems in the library domain. Discussion of cross-cutting issues such as Linked (Open) Data.
- 2011 - 2012 **INFO/CS 4302 – Web Information Systems** (*Cornell University*), instructor: An advanced undergraduate and masters level course that introduces technologies for building data-centric information systems on the World Wide Web, shows the practical applications of such systems, and discusses their design and their social and policy context by examining cross-cutting issues such as citizen science, data journalism and open government.
- Fall 2012 **CS 5999 – Master of Engineering Projects** (*Cornell University*), instructor: Independent or group project under the direction of a CS field member or researcher. Projects involve the development of a computer science application (software or hardware) useful in exploring and/or solving an engineering problem with a computer science focus.
- 2007–2011 **Multimedia Information Systems 2** (*University of Vienna*), instructor: A masters level course in Media Informatics that examines the technologies and available applications for building multimedia information systems in distributed environments such as the Web. A strong focus is on XML and Semantic Web technologies and on metadata standards.
- 2009–2011 **Multimedia Information Retrieval** (*University of Vienna*), instructor: An advanced masters level course focusing on the principles of information retrieval in distributed environments such as the Web, with a special focus on multimedia information objects.

- 2008–2011 **Information System Technologies for Multimedia Applications** (*University of Vienna*), instructor: An advanced undergraduate course focusing on the technical properties of various media types (image, audio, video) and their technical processing (e.g., with Java Media Framework) in multimedia applications.
- 2008–2011 **Media Informatics Student Projects** (*University of Vienna*), instructor: An advanced undergraduate course where groups of students are building applications for selected topics in media informatics.
- 2007–2011 **Modeling Techniques and Methods** (*University of Vienna*), instructor: An undergraduate introductory course covering basic data modeling standards such as EER, UML, etc.

Fellowships and Awards

- Nominee for Austrian “Staatspreis Digitalisierung”, 2019
- Open Humanities Award, 2013
- EU PEOPLE International Outgoing Fellowship (Marie Curie), 2011
- *Certificate of Appreciation*, Faculty of Computer Science, Univ. of Vienna, (2010 & 2011)

Grants and Third-Party Funded Projects

- 04/2021 - 03/2023 **INTERACTIVE**, *FFG Production of the Future, Coordinator*. This project will design and develop workflows and algorithmic methods that enable machine learning in distributed edge computing environments despite missing or insufficient ground-truth data.
- 10/2020 - 09/2022 **KRYPTOMONITOR**, *KIRAS, Coordinator*. This project will develop generic cryptoasset analysis methods that support the analysis of smart contracts and off-chain transactions in addition to native cryptocurrency transactions.
- 10/2019 - 09/2022 **COGNITUS**, *FFG IKT der Zukunft, Coordinator*. The goal of this project is to systematically investigate deep learning-based outage prediction methods and to develop generic algorithmic building blocks for explainable predictions and maintenance processes that are applicable across industries.
- 07/2019 - 09/2020 **Deep Learning Applications**, *Contract Research, Principal Investigator*. This project explores usage of Deep Learning techniques (auto-encoders) for detecting anomalies in industrial sensor datasets and the application of imitation and transfer learning for an autonomous driving simulation.
- 06/2019 - 05/2024 **Austrian Blockchain Center**, *FFG COMET K1 Research Center, Area Lead Data Science*. The center’s mission is to be the one-stop-shop Austrian Research Center for Blockchain (and related) technologies to be applied in industrial applications like industry 4.0 / IoT as well as financial, energy, logistics, government and administrative applications.
- 01/2019 - 12/2021 **DeepRUL**, *FFG Industrial PhD Program, Coordinator, Internal PhD Supervisor*. The goal of this project is to investigate the application of Deep Learning techniques for the prediction of machine health indicators, such as Remaining Useful Life (RUL) or Time to Failure (TTF).

- 05/2018 - 01/2019 **Smart Data for Manufacturing (SD4M)**, *Contract Research, Co-Principal Investigator*. The goal of this project is to investigating possible machine learning models for predicting outages of etching equipments in the semiconductor industry.
- 04/2018 - 04/2021 **TRAVELOGUES**, *Austrian Science Fund (FWF), Co-Principal Investigator*. This interdisciplinary international (DACH FWF-DFG) digital humanities project aims at gaining insight into the perception of the Other (focusing on the Orient) by analyzing an extensive collection of travelogues covering the period from 1500 until 1875.
- 01/2018 - 12/2019 **VIRTCRIME**, *FFG KIRAS, Coordinator*. The goal of the this project lies in the development of novel algorithms and methods for tracing criminal transactions in post-Bitcoin era cryptocurrencies, while considering illegitimate activities in Darknet marketplaces.
- 05/2017 - 05/2020 **TITANIUM**, *EU H2020 Call SEC-12-FCT-2016-2017, Proposal Author*. This project provides new tools and technologies to law enforcement agencies (LEAs) for investigating criminal and terrorist activities involving virtual currencies and/or underground markets.
- 09/2015 - 12/2017 **GraphSense**, *FFG IKT der Zukunft, Coordinator*. The goal of the GraphSense project is to research and develop novel algorithmic solutions for detecting anomalies in large-scale, dynamically changing graph datasets. The focus will be on developing anomaly detection techniques for transaction networks constructed from virtual currencies (Bitcoin) and investigate their applicability for enterprise financial fraud detection settings.
- 04/2015 - 12/2017 **SWC - Data Science Advisory**, *Contract Research, Principal Investigator*. In my role as Chief Data Scientist, I am advising Semantic Web Company, which is Vienna-based SME, in applying data science methods for the development of novel product features.
- 10/2014 - 01/2017 **BITCRIME**, *FFG KIRAS, Scientist, WP Lead*. Research and development of methods to prevent and prosecute organized crime in virtual currencies. The project also investigates novel Anti Money Laundering (AML) strategies taking into account the pseudo-anonymity of Bitcoin users.
- 12/2011 - 04/2014 **ResourceSync**, *Alfred P. Sloan Foundation, Scientist*. Research, develop, prototype, test, and deploy mechanisms for the large-scale synchronization of web resources.
- 12/2011 - 02/2013 **Maphub**, *Andrew W. Mellon Foundation, Principal Investigator*. Examine the application of Open Annotations in the context of historic map material.
- 03/2011 - 02/2014 **SciLink**, *EU PEOPLE IOF (Marie Curie), Principal Investigator*. Research on (i) interactive links discovery in scholarly publication processes, (ii) strategies for maintaining link integrity, and (iii) novel Web-based resource aggregation and presentation interfaces for scholarly publication workflows.

Standards and Specifications

- **ANSI/NISO ResourceSync Framework Specification**, *co-editor*: describes a synchronization framework for the web consisting of various capabilities that allow third party systems to remain synchronized with a server's evolving resources.

- **W3C Open Annotation Data Model**, *contributor*: specifies an interoperable framework for creating associations between related resources, annotations, using a methodology that conforms to the Architecture of the World Wide Web. Open Annotations can easily be shared between platforms, with sufficient richness of expression to satisfy complex requirements while remaining simple enough to also allow for the most common use cases, such as attaching a piece of text to a single web resource.

Media Coverage

- *Facebooks Pläne für eine Währung der Konzerne*. Die Presse, 2019-10-15
- *The anatomy of a sextortion spam campaign*. MIT Technology Review, 2019-08-19
- *Facebook legt sich mit Dollar und Bitcoin an*. Die Presse, 2019-06-18.
- *Krypto-Kriminellen das Handwerk legen*. Der Standard, 2018-05-09.
- *Bitcoin*. ORF Report, 2017-06-06, https://www.youtube.com/watch?v=691m_MasmBg
- *Können Maschinen Hasspostings im Netz erkennen?* Deutschlandradio Kultur, 2015-10-31.
- *Der ewige Streit um den Zugang zum Wissen*. Der Standard, 2015-10-21.

Recent Invited Talks and Panels

- *Decentralized Finance (DeFi) - Understanding Risks in an Emerging Financial Paradigm*, 1st Annual Conference of the Austrian Blockchain Center (ABC), March 2021, Online.
- *Laundering Money with Cryptoassets: Known Strategies and Containment Methods*, Austrian Blockchain Center (ABC), February 2021, Online.
- *Challenges and Abuse of Virtual Currencies*, International Digital Security Forum, December 2020, Vienna, Austria.
- *Anomaly Detection in Industrial Data Science*, Platform Industry 4.0, June 2020, Vienna, Austria.
- *Cryptoasset Analytics - Insights from Analyzing Large-Scale Financial Transaction Graphs*, Blockchain & Wine Meetup, March 2020, Vienna, Austria.
- *Cryptoasset Forensics - State of the Art and Upcoming Challenges*, Cybercrime Expert Circle Meeting, January 2020, Vienna, Austria.
- *Cryptocurrency Forensics and its relevance for tax compliance and enforcement*, Austrian Tax compliance and enforcement conference, November 2019, Vienna, Austria.
- *Token systems, payment channels, and corporate currencies*, Austrian Financial Market Authority (FMA), November 2019, Vienna, Austria.
- *Roundtable: Digitization of Money and Finance: Challenges and Opportunities*, Workshop on Digital currencies, central banks and the blockchain: policy implications, October 2019, Oesterreichische Nationalbank, Vienna, Austria.
- *Can a blockchain solve the trust problem?*, INTERPOL World Blockchain Co-Creation Lab, July 2019, Singapore.
- *Cryptoasset Forensics*, Raiffeisen Bank International Security Conference, May 2019, Langenlois.
- *The Post-Bitcoin Universe...and what it means for future cybercrime investigations*, APWG.EU Symposium on Electronic Crime Research, September 2018, Krakow, Poland.

- *The Post-Bitcoin Era. Emerging Technologies and Regulatory Challenges*, Informal ECOFIN Meeting, September 2018, Vienna, Austria.
- *Artificial Intelligence, Big Data and Human Rights – discrimination and other potential challenges (Panel)*, IFIP Summer School 2018 on Fairness, Accountability, and Transparency in the Age of Big Data, August 2018, Vienna, Austria.
- *Measurements in Cryptocurrency Networks*, TMA Experts Summit, June 2018, Vienna, Austria.
- *Tutorial on Post-Bitcoin Cryptocurrencies, Off-Chain Transaction Channels, and Cryptocurrency Analytics Techniques*, Austrian Financial Market Authority (FMA), May 2018, Vienna, Austria.
- *Insight into Cryptocurrencies — Methods and Tools for Analyzing Blockchain-based Ecosystems*, Austrian Economic Chambers, February 2018, Vienna, Austria.
- *O Bitcoin Where Art Thou? An Introduction to Cryptocurrency Analytics*, Oesterreichische Nationalbank (OeNB), Research Seminar, January 2018, Vienna, Austria.
- *Cryptocurrency Analytics (Bitcoin and beyond)*, Monero Meetup Vienna, December 2017, Vienna, Austria.
- *Panel: Cryptocurrencies & eCrime*, APWG.EU eCrime Cyber-Security Symposium, October 2017, Porto, Portugal.
- *Insight Into Virtual Currencies and Darknet Market Activities*, Media4Sec - Policing the Dark Web Workshop, September 2017, The Hague.
- *Blockchain und Cyber-Währung (Panel)*, Digital Days 2017, September 2017, Vienna, Austria.
- *Insight into Virtual Currency Ecosystems (by making use of Big Data technology)*, Big Data Europe (BDE) Webinar, February 2017, Online.
- *Virtual Currencies and their Role in Cybercrime*, Kuratorium Sicheres Österreich (KSÖ) - Workshop on Urban Security, November 2016, Vienna, Austria.
- *Virtual Currency Transaction Analytics*, APWG eCrime.EU Symposium, October 2016, Bratislava, Slovakia.
- *Exploring and Tracking Bitcoin Transactions*, 3rd EUROPOL Virtual Currencies Conference, July 2016, The Hague, Netherlands.
- *Bitcoin Tutorial*, Erste Bank Group, October 2015.
- *Bitcoin Panel*, APWG - Symposium on Electronic Crime Research, May 2015, Barcelona, Spain.
- *Bitcoin - Introduction, Technical Aspects and Ongoing Developments*, FMA - Austrian Financial Market Authority, April 2015.
- *GraphSense - Real-time Insight into Virtual Currency Ecosystems*, Austrian Data Forum, April 2015.

Research Visits

- *Los Alamos National Labs*. May 2009, Los Alamos, USA.

Event organization

Conferences and Symposia

- *Panel: From Crypto- to Corporate Currencies (?)*. University of Vienna (MQ). Oct. 2019.
- *Symposium on Post-Bitcoin Cryptocurrencies*. Museumsquartier (MQ) Vienna. Oct. 2018.
- *14th International Conference on Semantic Systems (SEMANTICS 2018)*, Vienna, Austria, Data Science chair
- *13th International Conference on Semantic Systems (SEMANTICS 2017)*, Amsterdam, Netherlands, Data Science chair
- *12th International Conference on Semantic Systems (SEMANTICS 2016)*, Leipzig, Germany, Research & Innovation co-chair
- *11th International Conference on Web Engineering (ICWE 2011)*, Doctoral consortium co-chair
- *International Conference on Dublin Core and Metadata Applications (DC 2008)* - Poster chair.
- *Very Large Databases Conference (VLDB 2007)*, Vienna, Austria – local conference organization.

Workshops

- *DSci'15 - Workshop on Data Science Methods, Technologies, and Applications*, co-located with SEMANTICS 2015, Vienna.
- *Linked Data Camp 2009*. At Museumsquartier (MQ) Vienna.
- *Web of Data Practitioner's Days 2008*. At the University of Vienna.

Tutorials

- *Web of Data in the Context of Multimedia*. At 4th International Conference on Semantic and Digital Media Technologies (SAMT2009), Graz, Austria.
- *Semantic Digital Libraries Tutorial*. At the 16th World Wide Web Conference (WWW 2007), the 4th European Semantic Web Conference (ESWC 2007), and the ACM/IEEE Joint Conferences on Digital Libraries (JCDL 2006).

Scientific Peer Review

Journals

- *Computers and Security* (2021)
- *Decisions in Economics and Finance* (DEAF) (2020)
- *Advances in Complex Systems* (ACS) (2020)
- *Journal of Web Semantics* (JWS) (2013, 2014)
- *International Journal on Semantic Web and Information Systems* (IJSWIS) (2012, 2014)
- *Semantic Web Journal* (SWJ) (2014)
- *Future Internet* (2013)
- *Computers* (2014)

- *International Journal on Semantic Web and Information Systems (IJSWIS)* (2012, 2013)
- *Multimedia Tools and Applications* (2010, 2011)
- *International Journal on Metadata, Semantics, and Ontologies* (2010, 2012)
- *International Journal on Digital Libraries* (2009, 2012)
- *ACM Computing Survey* (2009)

Conferences, Workshops, Symposia

- *IEEE DApps* (2020)
- *CRYPTO VALLEY Conference* (2019, 2020)
- *International Semantic Web Conference (ISWC)* (2019)
- *Linked Data on the Web (LDOW)* (2016, 2017, 2018)
- *International Conference on Semantic Systems (I-Semantics)* (2010–2016)
- *ACM/IEEE Joint Conference on Digital Libraries (JCDL)* (2014–2016)
- *Networked Knowledge Organization Systems and Services Workshop (NKOS)* (2006–2016)
- *International World Wide Web Conference (WWW)* (2012, 2015)
- *ACM Web Science* (2014, 2015)
- *International Conference on Theory and Practice of Digital Libraries (TPDL)* (2014–2015)
- *Computational Social Science Winter Symposium (CSSWS)* (2014)
- *Dublin Core Conference (DC)* (2008–2013)
- *International Conference on Web Engineering (ICWE)* (2011–2013)
- *Extended Semantic Web Conference (ESWC)* (2010, 2012)
- *IEEE Conference on Commerce and Enterprise Computing (CEC)* (2010–2012)

Open Source Software Contributions

- *GraphSense*: A cross-ledge cryptocurrency analytics platform. Available at: <https://www.graphsense.info/>
- *Wikigrouth*: A Python tool for extracting entity mentions from a collection of Wikipedia documents. Available at: <https://github.com/behas/wikigrouth>
- *ResourceSync*: Software implementing the ResourceSync data synchronization framework for the Web. Available at: <https://github.com/resync>
- *Maphub*: A system that allows people to cross-reference historical maps with resources in Web-based knowledge graphs. It also demonstrates application of the W3C Open Annotation specification. Available at: <http://maphub.github.com>
- *Lucene-SKOS*: An analyzer module for Apache Lucene 4.x and Solr 4.x, which takes existing SKOS concepts schemes and performs term expansion for given Lucene documents and/or queries. Available at: <https://github.com/behas/lucene-skos>

- *qSKOS*: A command line tool and API for finding quality issues in SKOS vocabularies. Available at: <https://github.com/cmader/qSKOS/>
- *DSNotify*: A generic change detection framework for Linked Data sources that informs data-consuming actors about the various types of events (create, remove, move, update) that can occur in data sources. Available at <http://www.cibiv.at/~niko/dsnotify/>
- *OAI2LOD Server*: A leight-weight proxy server component that exposes any OAI-PMH compliant metadata repository as Linked (Open) Data. Available at <https://github.com/behas/oai2lod>

Open Data Publishing Contributions

- *Ransomware Payments in the Bitcoin Ecosystem*: a dataset containing 7,222 Bitcoin seed addresses related to 67 ransomware families. Available at: <https://doi.org/10.5281/zenodo.1238041>
- *data.europeana.eu*: A open dataset comprising metadata of 20 million texts, images, videos and sounds gathered from institutions all over Europe by Europeana. Available at: <http://data.europeana.eu/download/2.0/>