



# Dr Natasha Fernandes

Lecturer in Cyber Security, Macquarie University

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📍 Sydney, Australia

## Education and Qualifications

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<b>Ph.D in Computing</b>	Conferred: August, 2021
Macquarie University, Australia & École Polytechnique, Palaiseau, France	
<i>Thesis Title</i> Differential Privacy for Metric Spaces: Information-Theoretic Models for Privacy and Utility with New Applications to Metric Domains	
<i>Supervisors</i> Prof. Annabelle McIver and Prof. Catuscia Palamidessi	
<b>Masters of Research in Computing &amp; University Medal</b>	2017
Macquarie University, Australia	
<i>Thesis Title</i> A Novel Framework for Author Obfuscation using Generalised Differential Privacy	
<b>B.Sc in Pure Mathematics and Computer Science</b>	1997
University of Sydney, Australia	
<b>Associate Fellow of the Higher Education Academy (AFHEA)</b>	Dec, 2021

## Research Interests

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Differential privacy,  $d$ -privacy, text privacy, quantitative information flow, information theory, privacy-preserving n

## Recent Awards & Scholarships

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2022	Winner, John Makepeace Bennett Award for Best Computing Phd Dissertation in Australia & NZ.
2021	Recipient, Faculty of Science and Engineering Excellence in HDR Award (Macquarie University).
2021	Vice-Chancellor's Commendation for PhD Dissertation (Macquarie University).
2021	HDR Rising Star Award (Dept of Computing, Macquarie University).
2019-20	Data61 Top-up Scholarship.
2018-20	Commonwealth Research Training Pathway Scholarship.
2018	University Medal for Computing (Macquarie University).
2017	Cyber Security MRes Computing Prize for Academic Excellence (Macquarie University).

## Grants

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2021-22	Associate Investigator, ExploreCSR grant (Google philanthropic)	\$12,900
2021-22	Associate Investigator, TensorFlow for Autonomous Vehicles (Google philanthropic)	\$13,065
2020	PGRF Grant for Overseas Conference Travel (Macquarie University)	\$2,926

## Recent Employment History

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Nov 2021 - *Postdoctoral Associate, Macquarie University, Sydney*  
Mar 2022

Aug 2021 - *Postdoctoral Research Fellow, UNSW Canberra*  
Nov 2021

Mar 2020 - *Research Assistant / Sessional Tutor, Macquarie University, Sydney*  
July 2021

Jan 2012 - *Lead Engineer - Data Engineering Team, Yahoo!7, Sydney*

Jan 2015 **Responsibilities:** Scoping and delivery of Semantic web publishing platform, design and implementation of NLP pipeline; mentoring junior developers.

**Technologies:** Semantic Web, NLP, Java, RabbitMQ, Graph databases, Protege (data modeling), SPARQL, Service Oriented Architecture (SOA), RDF

Jan 2008 - *Senior Software Engineer - Media Engineering Team, Yahoo!7, Sydney*

Dec 2011 **Responsibilities:** Technical specification, data modeling, code design, technical documentation and delivery of projects including Plus7 (catchup tv), 2011 Rugby World Cup website and the 2010 Australian federal election website.

**Technologies:** PHP, XML, XSLT, RESTful webservices, Perl, git, cvs

## Invited Talks

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- ▶ Invited Keynote Address, Australian Computer Science Weekly Conference, Sydney, Feb 2022.
- ▶ *Using Mathematics to Make Data Privacy Explainable*, Computing Industry Networking Event, Macquarie University, Dec 2021.
- ▶ *Comparing Systems: Quantitative Information Flow Refinement Orders and Application to Differential Privacy*, Alan Turing Institute, London, Aug 2021.
- ▶ *Locality Sensitive Hashing with Extended Differential Privacy*, France-Japan Cybersecurity Workshop, Bordeaux, Feb 2021.
- ▶ *Leakage and Refinement: A QIF Approach to Differential Privacy*, AIST, Tokyo, Oct 2019.

## Professional Activity

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- ▶ Invited Attendee at Shonan Meeting #164: *Differential Privacy and its Applications*, Nov, 2022.
- ▶ PC Member, Workshop on Privacy in Natural Language Processing (PrivateNLP), 2020-2021.
- ▶ Reviewer, Artificial Intelligence Review Journal, 2022.
- ▶ Reviewer, Journal of Transactions on Information Forensics and Security, 2021.
- ▶ Sub-Reviewer, International Symposium on Formal Methods (FM), 2021.
- ▶ Sub-Reviewer, Journal of Transactions on Dependable and Secure Computing, 2020.
- ▶ Sub-Reviewer, International Conference on Logic for Programming, AI and Reasoning (LPAR), 2020.
- ▶ Sub-Reviewer, Computer Security Foundations Symposium (CSF), 2019.
- ▶ Thesis Defence Examiner, UFMG Brazil, 2021.

## Teaching & Curriculum Development

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- ▶ Sessional Tutor, Macquarie University, 2020-21.
  - COMP2320 (Offensive Security).
  - COMP2010 (Algorithms and Data Structures).
- ▶ Indigenous Student Tutor, Macquarie University, 2018:
  - MATH1015 (1st Year Mathematics).
  - COMP7860, COMP8990 (Postgraduate Computing Research Units).

## Peer-Reviewed Publications

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### Conference Papers

1. Fernandes, N, A Mclver, and C Morgan (2022). How to Develop an Intuition for Risk... and Other Invisible Phenomena. In: *30th EACSL Annual Conference on Computer Science Logic (CSL 2022)*. Ed. by F Manea and A Simpson. Vol. 216. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, pp.2:1–2:14. <https://drops.dagstuhl.de/opus/volltexte/2022/15722>.
2. Fernandes, N, Y Kawamoto, and T Murakami (2021). Locality sensitive hashing with extended differential privacy. In: *European Symposium on Research in Computer Security*. **CORE Ranking: A**. Springer, pp.563–583.
3. Fernandes, N, A Mclver, and C Morgan (2021). The Laplace Mechanism has optimal utility for differential privacy over continuous queries. In: *ACM/IEEE Symposium on Logic in Computer Science (LICS 2021)*. **CORE Ranking: A\***. IEEE.
4. Alvim, MS, N Fernandes, A Mclver, and GH Nunes (2020). On Privacy and Accuracy in Data Releases (Invited Paper). In: *31st International Conference on Concurrency Theory (CONCUR 2020)*. **CORE Ranking: A**. Ed. by I Konnov and L Kovács. Vol. 171. Leibniz International Proceedings in Informatics (LIPIcs). Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum für Informatik, pp.1:1–1:18. <https://drops.dagstuhl.de/opus/volltexte/2020/12813>.
5. Chatzikokolakis, K, N Fernandes, and C Palamidessi (2019). Comparing systems: max-case refinement orders and application to differential privacy. In: *IEEE 32nd Computer Security Foundations Symposium (CSF 2019)*. **CORE Ranking: A**. IEEE, pp.442–44215.
6. Fernandes, N, M Dras, and A Mclver (2019). Generalised differential privacy for text document processing. In: *International Conference on Principles of Security and Trust (ETAPS/POST)*. Springer, Cham, pp.123–148.
7. Fernandes, N, K Lefki, and C Palamidessi (2019). “Utility-Preserving Privacy Mechanisms for Counting Queries”. In: *Models, Languages, and Tools for Concurrent and Distributed Programming*. Springer, Cham, pp.487–495.
8. Fernandes, N, M Dras, and A Mclver (2018). Processing text for privacy: an information flow perspective. In: *International Symposium on Formal Methods (FM 2018)*. **CORE Ranking: A**. Springer, Cham, pp.3–21.

### Journal Papers

1. Chatzikokolakis, K, N Fernandes, and C Palamidessi (2021). Refinement Orders for Quantitative Information Flow and Differential Privacy. *Journal of Cybersecurity and Privacy* 1(1), 40–77.