Bernard A. Hernández Pérez

13 All Saints Court • SW11 4BU • London, United Kingdom
07543252365 • b.hernandez-perez@imperial.ac.uk
LinkedIn • Google Scholar • Website

Experience

- **Imperial College London** **London, United Kingdom**
  Research Associate, Deparment of Electrical and Electronic Engineering *January 2020–Present*
  - Artificial Intelligence and machine learning to devise clinical decision support systems (CDSS) from clinical, physiological and imaging data for the early identification of dengue shock under the "Innovations for impact in resource-limited settings" Wellcome Trust innovations flagship programme. The team combines clinical expertise from Oxford University Clinical Research Unit (OUCRU) and Hospital for Tropical Diseases (HTD) in Ho Chi Minh City, Vietnam paired with biomedical engineers and computational scientists from University of Oxford, King's college London (KCL), Imperial College London (ICL) and Eidgenössische Technische Hochschule (ETH), Zurich.
- **Imperial College London** **London, United Kingdom**
  Research Assistant, Deparment of Electrical and Electronic Engineering *April 2014–April 2019*
  - Enhanced, Personalized and Integrated Care for Infection Management at the point of Care (EPIC IMPOC) is an NIHR i4i funded project to develop an intelligent clinical decision support system to support clinicians prescribe the most appropriate antibiotics. EPIC IMPOC is a collaborative project between clinicians and other healthcare professionals from the National Institute for Health Research Health Protection and Research Unit (NIHR HPRU) and engineers from the Centre for Bioinspired Technology (CBIT).

Education

- **Imperial College London (ICL)** **London, United Kingdom**
  PhD in Computer Science & Healthcare *2015–2019*
- **Royal Institute of Technology (KTH)** **Stockholm, Sweden**
  M.Sc. in Machine Learning (2 years) *2011–2013*
- **Rey Juan Carlos University (URJC)** **Madrid, Spain**
  B.Sc. in Telecommunications (5 years) and Computer Science (3 years) *2007–2013*
- **Other courses** **Online**
  In partnership with other universities and with online certificate
  - Machine Learning, Andrew Ng (Stanford) *2011*
  - Artificial Intelligence, Sebastian Thrun (Stanford) *2011*

Languages

Spanish : Mother tongue.
English : Upper Intermediate writing and oral proficiency.

Skills

Industry knowledge: Machine Learning, Data Manipulation, Clinical Decision Support Systems
Professional skills: Project Management, Full-stack developer, Software Testing, Version Control Systems
Programming: Python (highly skilled), Matlab, R, Java, C, C++, Javascript, CSS, HTML, PL/SQL
Python: pandas, numpy scipy, scikit-learn, keras, pytorch, matplotlib, seaborn, plotly, flask, django, celery
Technologies: CI/CD - GitHub, Docker, Travis, Codecov, ReadTheDocs, AWS, Heroku, APIs
Open source contributions: Shogun-Toolbox (A Large Scale Machine Learning Toolbox)

Research Funding and Awards

- **Imperial College COVID-19 Response Fund (100,000£)** **Imperial College London**
  Granted by the "Imperial College London" *2020*
  Grant to re-purpose EPiC IMPOC to support decision making around COVID-19
- **Featured innovative start-up at Tech Foresight 2040** **Imperial College London**
  Featured by "Imperial Tech Foresight" *2020*
  Event discussing breakthrough technologies and their potential impact
- **Techcelerate Award (£30,000)** **Imperial College London**
  Awarded by the "Imperial Techcelerate Programme" *2020*
  Entrepreneurial programme for postdocs to fast-track their business ideas
- **Imperial-UCT Global Health Fellows Programme (£3,000)** **Imperial College London**
  Awarded by the "Imperial International Relations Office and the Graduate school" *2016*
  Professional skills programe for postdocs with an additional research placement
- **ARC Best Poster Award** **Imperial College London**
  Awarded by the "Antimicrobial Research Collaborative" *2016*
  Conference to promote multidisciplinary collaborations in AMR
- **Antimicrobial Resistance Diagnostics Competition - AMR DxC** **University of Edinburgh**
  Awarded by the "University of Edinburgh" *2015*
  Programme to promote multidisciplinary collaborations to develop new AMR diagnostics
- **Young Researchers Best Thesis Award (£1,000)** **Rey Juan Carlos University**
  Awarded by the "Rey Juan Carlos University Social Council" *2013*
  Best thesis in the field of Computer Science
- **Leonardo Scholarship (£1,500)** **Rey Juan Carlos University**
  Granted by the "Spanish Ministry of Science and Innovation" *2012*
  Practical project at the Innovation and Research Initiative for Free Software
- **Erasmus Scholarship (£5,000)** **Rey Juan Carlos University**
  Granted by the "Spanish Ministry of Science and Innovation" *2011*
  Exchange year at the Royal Institute of Technology

Student Supervision

- **Imperial College London** **London, United Kingdom**
  Research Associate, Deparment of Electrical and Electronic Engineering *2020-Present*
  - Supervised 15 students (M.Sc. and M.Eng.) on various topics including expert systems, machine learning, natural language processing, data analysis and software development such as packages, server architectures and user interfaces.
  - Responsible for guiding students on best practices to conduct research including analytical thinking, problem solving, troubleshooting and communication of results effectively through scientific manuscripts, reports and presentations. Emphasis on stimulating good software development practices, regular one-to-one meetings for guidance/troubleshooting and group meetings to enhance their collaboration, communication and feedback skills.

Publications

Journal articles

2023 **Hernandez, Bernard**, Oliver Stiff, Damien K. Ming, Chanh Ho Quang, Vuong Nguyen Lam, Tuan Nguyen Minh, Chau Nguyen Van Vinh, Nguyet Nguyen Minh, Huy Nguyen Quang, Lam Phung Khanh, Tam Dong Thi Hoai, Trung Dinh The, Trieu Huynh Trung, Bridget Wills, Cameron P. Simmons, Alison H. Holmes, Sophie Yacoub, Pantelis Georgiou, and VITAL Consortium. Learning meaningful latent space representations for patient risk stratification: Model development and validation for dengue and other acute febrile illness. *Frontiers in Digital Health*, 5, February 2023. ISSN 2673-253X. doi: 10.3389/fdgth.2023.1057467. URL Link

2023 Quang Huy Nguyen, Damien K Ming, An Phuoc Luu, Ho Quang Chanh, Dong Thi Hoai Tam, Nguyen Thanh Truong, Vo Xuan Huy, **Hernandez, Bernard**, Jennifer Ilo Van Nuil, Chris Paton, et al. Mapping patient pathways and understanding clinical decision-making in dengue management to inform the development of digital health tools. *BMC Medical Informatics and Decision Making*, 23(1):24, Feb 2023. doi: 10.1186/s12911-023-02116-4. URL Link

2022 William J Bolton, Timothy M Rawson, **Hernandez, Bernard**, Richard Wilson, David Antcliffe, Pantelis Georgiou, and Alison H Holmes. Machine learning and synthetic outcome estimation for individualised antimicrobial cessation. *Frontiers in Digital Health*, 4, November 2022d. doi: 10.3389/fdgth.2022.997219. URL Link

2022 Van-Khoa D. Le, Hai Bich Ho, Stefan Karolcik, **Hernandez, Bernard**, Heloise Greeff, Van Hao Nguyen, Nguyen Quoc Khanh Phan, Thanh Phuong Le, Louise Thwaites, Pantelis Georgiou, David Clifton, and the Vietnam ICU Translational Applications Laboratory (VITAL) Investigators . vital sqi: A python package for physiological signal quality control. *Frontiers in Physiology*, 13:2248, November 2022. ISSN 1664-042X. doi: 10.3389/fphys.2022.1020458. URL Link

2022 Damien K Ming, Nguyen M Tuan, Bernard Hernandez, Sorawat Sangkaew, Nguyen L Vuong, Ho Q Chanh, Nguyen VV Chau, Cameron P Simmons, Bridget Wills, Pantelis Georgiou, et al. The diagnosis of dengue in patients presenting with acute febrile illness using supervised machine learning and impact of seasonality. *Frontiers in Digital Health*, 4, March 2022c. doi: 10.3389/fdgth.2022.849641. URL Link

2022 Damien K. Ming, **Hernandez, Bernard**, Sorawat Sangkaew, Nguyen Lam Vuong, Phung Khanh Lam, Nguyen Minh Nguyet, Dong Thi Hoai Tam, Dinh The Trung, Nguyen Thi Hanh Tien, Nguyen Minh Tuan, et al. Applied machine learning for the risk-stratification and clinical decision support of hospitalised patients with dengue in vietnam. *PLOS Digital Health*, 1(1): e0000005, 2022b. URL Link

2021 **Hernandez, Bernard**, Pau Herrero-Viñas, Timothy M. Rawson, Luke S. P. Moore, Alison H. Holmes, and Pantelis Georgiou. Resistance trend estimation using regression analysis to enhance antimicrobial surveillance: A multi-centre study in london 2009–2016. *Antibiotics*, 10(10), 2021. ISSN 2079-6382. doi: 10.3390/antibiotics10101267. URL Link

2021 Damien K. Ming, Ashleigh C. Myall, **Hernandez, Bernard**, Andrea Y. Weiße, Robert L. Peach, Mauricio Barahona, Timothy M. Rawson, and Alison H. Holmes. Informing antimicrobial management in the context of covid-19: understanding the longitudinal dynamics of c-reactive protein and procalcitonin. *BMC infectious diseases*, 21(1):1–7, 2021. URL Link

2021 Timothy M. Rawson, **Hernandez, Bernard**, Richard C. Wilson, Damien Ming, Pau Herrero, Nisha Ranganathan, Keira Skolimowska, Mark Gilchrist, Giovanni Satta, Pantelis Georgiou, and Alison H. Holmes. Supervised machine learning to support the diagnosis of bacterial infection in the context of COVID-19. *JAC-Antimicrobial Resistance*, 3(1), 02 2021b. ISSN 2632-1823. doi: 10.1093/jacamr/dlab002. URL Link

2021 Timothy M. Rawson, **Hernandez, Bernard**, Luke S. P. Moore, Pau Herrero, Esmita Charani, Damien Ming, Richard C. Wilson, Oliver Blandy, Shiranee Sriskandan, Mark Gilchrist, Christofer Toumazou, Pantelis Georgiou, and Alison H. Holmes. A Real-world Evaluation of a Case-based Reasoning Algorithm to Support Antimicrobial Prescribing Decisions in Acute Care. *Clinical Infectious Diseases*, 72(12):2103–2111, 04 2021a. ISSN 1058-4838. doi: 10.1093/cid/ciaa383. URL Link

2019 Amparo Güemes, Giacomo Cappon, **Hernandez, Bernard**, Monika Reddy, Nick Oliver, Pantelis Georgiou, and Pau Herrero. Predicting quality of overnight glycaemic control in type 1 diabetes using binary classifiers. *IEEE Journal of Biomedical and Health Informatics*, 24(5):1439–1446, 2019. doi: 10.1109/JBHI.2019.2938305. URL Link

2018 Timothy M. Rawson, **Hernandez, Bernard**, Luke S. P. Moore, Oliver Blandy, Pau Herrero, Mark Gilchrist, Anthony Gordon, Christofer Toumazou, Shiranee Sriskandan, Pantelis Georgiou, and Alison H. Holmes. Supervised machine learning for the prediction of infection on admission to hospital: a prospective observational cohort study. *Journal of Antimicrobial Chemotherapy*, 74(4):1108–1115, 12 2018e. ISSN 0305-7453. doi: 10.1093/jac/dky514. URL Link

2018 Timothy M. Rawson, Luke S. P. Moore, Enrique Castro-Sanchez, Esmita Charani, **Hernandez, Bernard**, Vivian Alividza, Fran Husson, Christofer Toumazou, Raheelah Ahmad, Pantelis Georgiou, et al. Development of a patient-centred intervention to improve knowledge and understanding of antibiotic therapy in secondary care. *Antimicrobial Resistance & Infection Control*, 7(1):1–10, 2018b. URL Link

2017 Timothy M. Rawson, Luke S. P. Moore, **Hernandez, Bernard**, Esmita Charani, Enrique Castro-Sanchez, Pau Herrero, B Hayhoe, William Hope, Pantelis Georgiou, and Alison H. Holmes. A systematic review of clinical decision support systems for antimicrobial management: are we failing to investigate these interventions appropriately? *Clinical Microbiology and Infection*, 23(8):524–532, 2017b. ISSN 1198-743X. doi: https://doi.org/10.1016/j.cmi.2017.02.028. URL Link

2017 **Hernandez, Bernard**, Pau Herrero, Timothy M. Rawson, Luke S. P. Moore, Benjamin Evans, Christofer Toumazou, Alison H. Holmes, and Pantelis Georgiou. Supervised learning for infection risk inference using pathology data. *BMC medical informatics and decision making*, 17(1):1–12, 2017c. URL Link

2017 **Hernandez, Bernard**, Pau Herrero, Timothy M. Rawson, Luke S. P. Moore, Esmita Charani, Alison H. Holmes, and Pantelis Georgiou. Data-driven web-based intelligent decision support system for infection management at point-of-care: Case-based reasoning benefits and limitations. pages 119–127, 2017a. URL Link

2016 Timothy M. Rawson, Luke S. P. Moore, **Hernandez, Bernard**, Enrique Castro-Sanchez, Esmita Charani, Pantelis Georgiou, Raheelah Ahmad, and Alison H. Holmes. Patient engagement with infection management in secondary care: a qualitative investigation of current experiences. *BMJ Open*, 6(10), 2016d. ISSN 2044-6055. doi: 10.1136/bmjopen-2016-011040. URL Link

2016 Timothy M. Rawson, Luke S. P. Moore, **Hernandez, Bernard**, Enrique Castro-Sánchez, Esmita Charani, Raheelah Ahmad, and Alison H. Holmes. Missed opportunities for shared decision making in antimicrobial stewardship: The potential consequences of a lack of patient engagement in secondary care. *International Journal of Infectious Diseases*, 45:122–123, 2016b. URL Link

2016 Timothy M. Rawson, Esmita Charani, Luke S. P. Moore, **Hernandez, Bernard**, Enrique Castro-Sánchez, Pau Herrero, Pantelis Georgiou, and Alison H. Holmes. Mapping the decision pathways of acute infection management in secondary care among uk medical physicians: a qualitative study. *BMC medicine*, 14(1):1–10, 2016a. URL Link

Invited talks

2022 **Hernandez, Bernard**, Oliver Stiff, Damien K Ming, Nguyen Lam Vuong, Phung Khanh Lam, Nguyen Minh Nguyet, Dong Thi Hoai Tam, Dinh The Trung, Bridge Wills, Simmons Cameron, Alison H. Holmes, Sophie Yacoub, and Pantelis Georgiou. Learning a meaningful latent space representation for patient risk stratification: model development and validation for dengue. In *European Congress of Clinical Microbiology and Infectious Diseases (32nd ECCMID)*, 2022b

2020 **Hernandez, Bernard**, Pau Herrero, Timothy M. Rawson, Alison H. Holmes, and Pantelis Georgiou. How can ai help with antibiotic decision-making in hospitals? In *6th One World Health Congress*, 2020

2017 **Hernandez, Bernard**, Pau Herrero, Timothy M. Rawson, Luke S. P. Moore, Esmita Charani, Alison H. Holmes, and Pantelis Georgiou. Data-driven web-based intelligent decision support system for infection management at point-of-care: Case-based reasoning benefits and limitations. In *10th International Joint Conference on Biomedical Engineering Systems and Technologies*, pages 119–127, 2017b

Posters

2022 **Hernandez, Bernard**, Damien K Ming, Chanh Ho Quang, Vuong Nguyen Lam, Tuan Nguyen Minh, Chau Nguyen Van Vin, Nguyet Nguyen Minh, Huy Nguyen Quang, Lam Phung Khanh, Tam Dong Thi, Trung Dinh The, Trieu Huynh Trung, Bridget Wills, Cameron P. Simmons, Alison H Holmes, Sophie Yacoub, Pantelis Georgiou, and On behalf of the Vietnam ICU Translational Applications Laboratory (VITAL). A human-centred design approach towards development of a digital clinical decision-support system for management of hospitalised patients with dengue. In *International Conference on Infectious Diseases*, pages 194–195, November 2022a

2018 **Hernandez, Bernard**, Timothy M. Rawson, Pau Herrero, Luke S. P. Moore, Christofer Toumazou, Alison H. Holmes, and Pantelis Georgiou. Enhancing antimicrobial surveillance: an automated, dynamic and interactive approach. *International Journal of Infectious Diseases*, 73:122, 2018

2015 **Hernandez, Bernard**, Pau Herrero, Luke S. P. Moore, Esmita Charani, Alison H. Holmes, and Pantelis Georgiou. Data-driven web-based intelligent decision support system for infection management at point-of-care. *EMBRACE Conference on Multidisciplinary Approaches to Antimicrobial Resistance*, 2015. (Best poster award)

Live demonstrations

2016 Pau Herrero, Mohamed El-Sharkawy, Peter Pesl, **Hernandez, Bernard**, Lorraine Choi, Osama M. Awara, Yu Lee, Jian Lim, Mohamed M. Yusof, Aaron Sheah, Liyangyi Yu, and Pantelis Georgiou. Live demonstrator: Challenging the bio-inspired artificial pancreas with a mixed-meal model library. In *2016 IEEE International Symposium on Circuits and Systems (ISCAS)*, pages 1444–1444, 2016. doi: 10.1109/ISCAS.2016.7527527

Conference abstracts

2022 Stefan Karolcik, Vasileos Manginas, Ho Quang Chanh, John Daniels, Nguyen Thi Giang, Vu Ngo Thanh Huyen, Hoang Minh Tu Van, Khanh Phan Nguyen Quoc, **Hernandez, Bernard**, Damien K Ming, Alison H Holmes, Louise Thwaites, Sophie Yacoub, Pantelis Georgiou, and On behalf of the Vietnam ICU Translational Applications Laboratory (VITAL). A prospective clinical study on the use of a non-invasive wearable device and neural network models for patients with dengue. In *International Conference on Infectious Diseases*, November 2022

2022 George Zhao, Yuting Xing, **Hernandez, Bernard**, Timothy M. Rawson, Richard Wilson, Damien K. Ming, Pantelis Georgiou, and Alison H. Holmes. A natural language processing system for characterisation of radiology text reports. In *European Congress of Clinical Microbiology and Infectious Diseases (32nd ECCMID)*, 2022

2022 Damien K. Ming, **Hernandez, Bernard**, Sorawat Sangkaew, Nguyen Lam Vuong, Phung Khanh Lam, Nguyen Minh Nguyet, Dong Thi Hoai Tam, Dinh The Trung, Nguyen Thi Hanh Tien, Nguyen Minh Tuan, et al. A machine learning approach to dengue diagnosis and the impact of seasonality in patients presenting with an acute febrile illness in ho chi minh city, vietnam. In *European Congress of Clinical Microbiology and Infectious Diseases (32nd ECCMID)*, 2022a

2022 William Bolton, **Hernandez, Bernard**, Timothy M Rawson, Richard Wilson, Pantelis Georgiou, and Alison H Holmes. Predicting outcomes for individual patients receiving antibiotics using a recurrent neural network. In *European Congress of Clinical Microbiology and Infectious Diseases (32nd ECCMID)*, 2022c

2022 William Bolton, **Hernandez, Bernard**, Timothy M Rawson, Richard Wilson, Pantelis Georgiou, and Alison H Holmes. Analyzing the equalized odds fairness of mortality classification for infection patients. In *European Congress of Clinical Microbiology and Infectious Diseases (32nd ECCMID)*, 2022b

2022 William Bolton, **Hernandez, Bernard**, Timothy M Rawson, Richard Wilson, Pantelis Georgiou, and Alison H Holmes. Analyzing the impact of co-morbid obesity on infection outcomes in a large icu. In *European Congress of Clinical Microbiology and Infectious Diseases (32nd ECCMID)*, 2022a

2018 Timothy M. Rawson, **Hernandez, Bernard**, Oliver Blandy, Luke S. P. Moore, Pau Herrero, Christofer Toumazou, Shiranee Sriskandan, Pantelis Georgiou, and Alison H. Holmes. Supervised machine learning for the prediction of bacteremia using routinely collected blood science data. In *European Congress of Clinical Microbiology and Infectious Diseases (28th ECCMID)*, 2018d

2018 Timothy M. Rawson, **Hernandez, Bernard**, Oliver Blandy, Luke S. P. Moore, Esmita Charani, Mark Gilchrist, Christofer Toumazou, Shiranee Sriskandan, Pantelis Georgiou, and Alison H. Holmes. Case-based reasoning for individualized antimicrobial selection: can intelligent decision support improve antimicrobial management? In *European Congress of Clinical Microbiology and Infectious Diseases (28th ECCMID)*, 2018c

2018 Timothy M. Rawson, Luke S. P. Moore, Enrique Castro-Sanchez, Esmita Charani, **Hernandez, Bernard**, Vivian Alividza, Fran Husson, Christofer Toumazou, Raheelah Ahmad, Pantelis Georgiou, and Alison H. Holmes. Patient engagement with antimicrobial decision making in secondary care: a co-designed pilot intervention. In *European Congress of Clinical Microbiology and Infectious Diseases (28th ECCMID)*, 2018a

2017 Timothy M. Rawson, **Hernandez, Bernard**, Luke S. P. Moore, Enrique Castro-Sanchez, Esmita Charani, Pantelis Georgiou, Raheelah Ahmad, and Alison H. Holmes. Patient centred interventions to promote citizen engagement with infection related decision making. In *European Congress of Clinical Microbiology and Infectious Diseases (27th ECCMID)*, 2017d

2017 Timothy M. Rawson, Luke S. P. Moore, **Hernandez, Bernard**, Esmita Charani, Enrique Castro-Sanchez, Pau Herrero, Benedict Hayhoe, William Hope, Pantelis Georgiou, and Alison H. Holmes. Clinical decision support systems for antimicrobial management: a systematic review of interventions in primary and secondary care. In *European Congress of Clinical Microbiology and Infectious Diseases (27th ECCMID)*, 2017c

2017 Timothy M. Rawson, Esmita Charani, Luke S. P. Moore, **Hernandez, Bernard**, Enrique Castro-Sanchez, Pau Herrero, Pantelis Georgiou, and Alison H. Holmes. Mapping decision pathways for acute infection management in uk secondary care: a qualitative study. In *European Congress of Clinical Microbiology and Infectious Diseases (27th ECCMID)*, 2017a

2016 Timothy M. Rawson, Luke S. P. Moore, **Hernandez, Bernard**, Enrique Castro-Sanchez, Esmita Charani, Raheelah Ahmad, and Alison H. Holmes. Missed opportunities for shared decision making in antimicrobial stewardship: The potential consequences of a lack of patient engagement in secondary care. In *International Journal of Infectious Diseases (17th ICID)*, volume 45, pages 122–123, 2016c

2015 Timothy M. Rawson, Luke S. P. Moore, **Hernandez, Bernard**, Enrique Castro-Sanchez, Esmita Charani, Raheelah Ahmad, and Alison H. Holmes. Patient and public engagement in antimicrobial stewardship: a stakeholder analysis of share decision making during infection management. In *Federation of Infection Society*, 2015

2014 Luke S. P. Moore, Esmita Charani, Pau Herrero, Pantelis Georgiou, **Hernandez, Bernard**, and Alison H. Holmes. Case-based reasoning for antimicrobial prescribing decision support: A solution for critical care? In *Medical Engineering Centres Annual Meeting and Bioengineering*, 2014

Theses

2018 **Hernandez, Bernard**. *Data-driven web-based intelligent decision support system for infection management at point of care*. PhD thesis, Imperial College London, Department of Electrical and Electronic Engineering, London, UK, 2018. URL Link

2013 **Hernandez, Bernard**. *Multi-view object recognition and classification. Graph-based representation of visual features and structured learning and prediction*. Master's thesis, Kungliga Tekniska Hogskolan, School of Computer Science and Communication, Stockholm, Sweden, 2013a. URL Link

2013 **Hernandez, Bernard**. *Algorithms for detection and description of visual features for object recognition. Analysis and applications*. Bachelor's thesis, Rey Juan Carlos University, Department of Signal Theory and Communications, Madrid, Spain, 2013b