

Dimitrios Doudesis, PhD

✉ Dimitrios.Doudesis@ed.ac.uk ☎ 07547 790751 🌐 dimitriosdoudesis.com

Scientific profile

I am a Principal Investigator and Senior Data Scientist at The University of Edinburgh, specialising in data science, medical statistics and the development of AI-driven decision-support tools. My research focuses on advanced statistical modelling for acute cardiac disease diagnosis. I have secured funding for innovative projects, developed machine learning algorithms for predicting heart failure and heart attack diagnoses, and published high-impact original research in leading scientific journals. My goal is to implement AI-driven decision-support tools into clinical practice to enhance patient care.

Work experience

Principal Investigator & Senior Data Scientist, The University of Edinburgh, November 2023 – Present

- Developing *CoDE-ACS 2.0* and *CoDE-HF 2.0* using deep learning, incorporating ECG and chest X-ray data to enhance diagnostic accuracy and clinical utility.
- Developing an algorithm using statistical machine learning to predict the diagnosis of pulmonary embolism (*CoDE-PE*) in the Emergency Department.
- Leading the prospective validation of the *CoDE-HF* and *CoDE-ACS* machine learning algorithms using electronic health records (EHR) and respective biomarkers.
- Retraining the *CoDE-HF* and *CoDE-ACS* algorithms for different biomarkers/assays.
- Statistical and programming supervisor of two PhD students.

Course Lead/Lecturer, Health Data Science, The University of Edinburgh, September 2022 – Present

- Line manager of two teaching assistants.
- Delivered the course to over 300 students to date.
- The course was recognised in the 2023 Data Driven Innovation Annual Report as a flagship programme ([link](#)).

Contributed as a member of the group responsible for the Medical Schools Council (MSC) and Health Data Research UK (HDR UK) report, *Data Science in the Medical Curriculum: Equipping Medical Students for the Digital Age*, which outlines the essential data science skills and knowledge needed to meet the demands of the 21st-century healthcare landscape in the UK ([link](#)).

Postdoctoral Research Fellow/Data Scientist, The University of Edinburgh, March 2022 – October 2023

- Developed algorithms using statistical machine learning to predict the diagnoses of heart failure (*CoDE-HF*) and heart attack (*CoDE-ACS*) in the Emergency Department.
- Developed *CoDE-HF* and *CoDE-ACS* algorithms into products that integrate into the NHS clinical workflow.
- Co-led the modelling workstream, part of the *Artificial Intelligence in Acute Cardiac Care* project.
- Developed, deployed and maintenance of the online decision-support tools using R Shiny and Shiny server (<https://decision-support.shinyapps.io/code-hf/> & <https://decision-support.shinyapps.io/code-acsc/>).
- Developed statistical analysis plans, conducted sample size calculations and power analyses.
- Established national and international collaborations, which led to top-tier journal publications.

Research Fellow, The University of Edinburgh, October 2021 – February 2022

Wrote a successful grant to NIHR and NHSX for the development and validation of a machine learning algorithm to improve the diagnosis of heart attack. Responsible for the project management and the overall delivery of the grant (AI_AWARD02322).

Research Assistant, The University of Edinburgh, April 2020 – September 2020

Worked as a Research Assistant for Dr Areti Manataki on the project “*Student perspectives on Learning and Teaching Data Science in the MBChB programme*”. Publication: Doudesis D & Manataki A. 2022;159:104668.

Teaching Assistant, The University of Edinburgh, September 2019 – September 2021

Courses: *Data Science in Medicine; Machine Learning in Python; Introduction to Statistics; Statistics (Year 2); Statistical Modelling; Statistical Computing; Biomedical Data Science; Health Data Science*.

Data Analyst, PREDICTA S.A (former SPSS BI GREECE S.A), March 2017 – September 2017.

Worked as a Consultant for a systemic bank in Greece. Resigned from this position to pursue an MSc in the UK.

Qualifications

- **PhD, Data Science/Precision Medicine**, The University of Edinburgh, 2018 – 2022
Thesis: *Improving diagnosis in acute cardiac care using statistical machine learning*.
- **MSc, Medical Statistics**, The University of Southampton, 2017 – 2018
Dissertation: *Feature selection algorithms for the development of parsimonious statistical machine learning models*. (Distinction)
- **BSc, Statistics**, The Athens University of Economics and Business, 2013 – 2017
Grade 7.8/10. (Class rank: 2 of 118).

Continuing professional development

- Postgraduate Certificate Academic Practice (PgCAP), The University of Edinburgh, 2024 – 2025
Holders of the Certificate are automatically Fellows of the Higher Education Academy.
- The Edinburgh Manager, The University of Edinburgh, 2025

Professional affiliations

- Usher Institute, Health and Social Care Data-Driven Innovation Hub, 2024 – Present
- Certified Carpentries Instructor (R/RStudio), 2023 – Present
- Fellow of Royal Statistical Society (FRSS), 2021 – Present
- Associate Fellow of Higher Education (AFHE), 2021 – Present
- Member of Association of Data Scientists (MADaSci), 2021 – Present

Industry collaboration and engagement

- Worked as a consultant for health-tech companies, providing expertise in data science, AI, and machine learning for clinical applications ([link](#)).
- Established collaborations with leading pharmaceutical companies to further develop and implement my AI-driven decision-support tools.
- Developed academic-industry partnerships to translate research into real-world clinical applications, enhancing clinical decision support.

Patents

- The University of Edinburgh (Inventors: Doudehis, Lee, Mills). Algorithm for myocardial infarction, application number PCT/GB2023/052209, filed August 26, 2022.
- The University of Edinburgh (Inventors: Doudehis, Lee, Mills). Calculating the probability of acute heart failure using natriuretic peptide concentration, PCT application number PCT/GB2021/051470, filed June 12, 2020.

Academic honours and awards

- Young Investigator Award – Clinical Cardiology, Runner-up, European Society of Cardiology [ESC] Conference, 2020
- Bernard and Joan Marshall Early Career Investigator Award, Runner-up, British Society for Cardiovascular Research [BSCR] Meeting, 2023
- First prize, Scottish Heart and Arterial disease Risk Prevention [SHARP] Conference, 2022
- Innovation Award - Sponsored by Edinburgh Innovations & iTPA Translational Community, BHF/Centre for Cardiovascular Science Conference, 2022
- Postdoctoral poster prize, Runner-up, BHF/Centre for Cardiovascular Science Conference, 2024
- Forbes 30 Under 30 Europe 2024 – Science & Healthcare category, Shortlisted, 2024
- Rising Star, Chancellor's Award – BHF/Centre for Cardiovascular Science Nominee, 2023

Funding (Total = £2,2M)

Grants - current

- British Heart Foundation Project Grant (PG/24/12136). Artificial intelligence to improve the diagnosis of acute cardiovascular conditions. £343,663 (Principal Investigator)
- Medical Research Council Impact Acceleration Account Award (MRC/IAA/021). Artificial intelligence for the diagnosis of acute pulmonary embolism in the Emergency Department. £99,650 (Principal Investigator)

Grants - completed

- Wellcome Leap. Artificial intelligence in acute cardiac care. £1,2M (Co-applicant).
- British Heart Foundation Translational Award (TA/F/22/210039). Artificial intelligence to guide the diagnosis of acute heart failure using the CoDE-HF algorithm. £265,622 (Co-applicant)
- Medical Research Council Confidence in Concept Award (MRC/CIC8/79). AI guided diagnosis of acute heart failure using the CoDE-HF algorithm. £143,800 (Co-applicant)
- Accelerated Access Collaborative in partnership with NHSX and the National Institute for Health Research Artificial Intelligence in Health and Care Award (AI_AWARD02322). Machine learning to improve the diagnosis of acute myocardial infarction. £134,589 (Co-applicant)
- British Heart Foundation Centre for Research Excellence. AI guided diagnosis of acute heart failure using the CoDE-HF algorithm. £24,741 (Co-applicant)
- Medical Research Council Confidence in Concept Translational Bursary. £1,613 (Principal Investigator)

Scholarships

- Medical Research Council Scholarship for PhD in Data Science/Precision Medicine, The University of Edinburgh (3.5 years - fees, stipend, and research costs), £85,960
- National Institute for Health Research Scholarship for MSc in Medical Statistics, The University of Southampton (1 year - fees and stipend), £23,553

Programming skills

• R • R Shiny (App development) • Python • SQL • SPSS Modeler • SPSS Statistics • GitHub ([DimitriosDoudesis](#))

Public engagement and press

My articles “*Machine learning for diagnosis of myocardial infarction using cardiac troponin concentrations*” published in *Nature Medicine*, “*Validation of the myocardial-ischaemic-injury-index machine learning algorithm to guide the diagnosis of myocardial infarction in a heterogenous population: a prespecified exploratory analysis*” published in *The Lancet Digital Health* and “*Development and validation of a decision support tool for the diagnosis of acute heart failure: systematic review, meta-analysis, and modelling study*” published in *The BMJ* were extensively covered in the national print, online news, radio and television. Coverage included: The Times, The Independent, Sky News, ITV News, The Sun, Daily Mail, Daily Telegraph, The Herald, The Scotsman and The National and multiple press releases from the BHF and the University of Edinburgh.

I am also a member of the Public Engagement Committee at the Centre for Cardiovascular Science, contributing to initiatives that promote public awareness and engagement with cardiovascular research.

References

Professor Nicholas L Mills
Professor of Cardiology
Royal Infirmary Edinburgh, UK
Email: nick.mills@ed.ac.uk

Dr Atul Anand
Reader in Health Data Research
Royal Infirmary Edinburgh, UK
Email: atul.anand@ed.ac.uk

Publications (27 articles, 852 citations, h-index 13)

1. **Doudesis D**, Lee KK, Boeddinghaus J, Bularga A, Ferry AV, Tuck C, et al. Machine learning for diagnosis of myocardial infarction using cardiac troponin concentrations. *Nature Medicine*. 2023;29(5):1201-10.
2. **Doudesis D***, Lee KK*, Anwar M*, Astengo F, Chenevier-Gobeaux C, Claessens Y-E, et al. Development and validation of a decision support tool for the diagnosis of acute heart failure: systematic review, meta-analysis, and modelling study. *BMJ*. 2022;377:e068424.
3. **Doudesis D***, Lee KK*, Ferry AV, Chapman AR, Kimenai DM, Fujisawa T, et al. Implementation of high-sensitivity cardiac troponin and risk of myocardial infarction or death at 5 years. *BMJ*. 2023;383:e075009
4. **Doudesis D***, Boeddinghaus J*, Lopez-Ayala P*, Lee KK, Bularga A, Li C, et al. Machine learning for myocardial infarction compared to guideline recommended diagnostic pathways. *Circulation*. 2024;149(14):1090-101.
5. **Doudesis D**, Lee KK, Yang J, Wereski R, Shah AS, Tsanas A, et al. Validation of the myocardial-ischaemic-injury-index machine learning algorithm to guide the diagnosis of myocardial infarction in a heterogenous population: a prespecified exploratory analysis. *The Lancet Digital Health*. 2022;4(5):e300-e8.
6. **Doudesis D***, Koechlin L*, Boeddinghaus J*, Lopez-Ayala P, Zimmermann T, Rumora K, et al. Diagnostic and prognostic performance of high-sensitivity cardiac troponin T vs I. *Journal of the American College of Cardiology*. 2025;85 (4) 381–385.
7. **Doudesis D***, Lee KK*, Bing R, Astengo F, Perez JR, Anand A, et al. Sex differences in oral anticoagulation therapy in patients hospitalized with atrial fibrillation: a nationwide cohort study. *Journal of the American Heart Association*. 2023;0:e027211.
8. **Doudesis D***, Lowry MTH*, Boeddinghaus J, Kimenai DM, Bularga A, Taggart C, et al. Troponin in early presenters to rule out myocardial infarction. *European Heart Journal*. 2023;44(30):2846-58.
9. **Doudesis D**, Mills NL. Improving the diagnosis of myocardial infarction with machine learning. *Nature Medicine*. 2023 May 17.
10. **Doudesis D**, Manataki A. Data science in undergraduate medicine: course overview and student perspectives. *International Journal of Medical Informatics*. 2022;159:104668.
11. Lowry MTH, **Doudesis D**, Wereski R, Kimenai DM, Tuck C, Ferry AV, et al. Influence of age on the diagnosis of myocardial infarction. *Circulation*. 2022;146(15):1135-48.
12. Lee KK, **Doudesis D**, Ross DA, Bularga A, MacKintosh CL, Koch O, et al. Diagnostic performance of the combined nasal and throat swab in patients admitted to hospital with suspected COVID-19. *BMC infectious diseases*. 2021;21(1):1-11.
13. Georgiev K, **Doudesis D**, McPeake J, Mills NL, Fleuriot J, Shenkin SD, et al. Understanding hospital rehabilitation using electronic health records in patients with and without COVID-19. *BMC Health Serv Res*. 2024;24(1):1245.
14. Valavani E, **Doudesis D**, Kourtesis I, Chin RF, Macintyre DJ, Fletcher-Watson S, et al. Data-driven insights towards risk assessment of postpartum depression. *BIOSIGNALS*; 2020 (pp. 382-389).
15. Lee KK, **Doudesis D**, Mair J, Mills NL, Study Group on Biomarkers of the ESCAfACC. Clinical decision support using machine learning and natriuretic peptides for the diagnosis of acute heart failure. *Eur Heart J Acute Cardiovasc Care*. 2024;13(6):515-6.

16. Lowry MTH, Kimenai DM, **Doudesis D**, Georgiev K, McDermott M, Bularga A, et al. The electronic frailty index and outcomes in patients with myocardial infarction. *Age Ageing*. 2024;53(7).
17. Perez-Vicencio D, Thurston AJF, **Doudesis D**, O'Brien R, Ferry A, Fujisawa T, et al. Risk scores and coronary artery disease in patients with suspected acute coronary syndrome and intermediate cardiac troponin concentrations. *Open Heart*. 2024;11(2).
18. Bularga A, Meah MN, **Doudesis D**, Shah AS, Mills NL, Newby DE, et al. Duration of dual antiplatelet therapy and stability of coronary heart disease: a 60 000-patient meta-analysis of randomised controlled trials. *Open Heart*. 2021;8(2):e001707.
19. Wereski R, Kimenai DM, Taggart C, **Doudesis D**, Lee KK, Lowry MTH, et al. Cardiac troponin thresholds and kinetics to differentiate myocardial injury and myocardial infarction. *Circulation*. 2021;144(7):528-38.
20. Lee KK, Bularga A, O'Brien R, Ferry AV, **Doudesis D**, Fujisawa T, et al. Troponin-guided coronary computed tomographic angiography after exclusion of myocardial infarction. *Journal of the American College of Cardiology*. 2021;78(14):1407-17.
21. Tibble H, Chan A, Mitchell EA, Horne E, **Doudesis D**, Horne R, et al. A data-driven typology of asthma medication adherence using cluster analysis. *Scientific reports*. 2020;10(1):1-8.
22. Lee KK, Bing R, Kiang J, Bashir S, Spath N, **Doudesis D**, et al. Adverse health effects associated with household air pollution: a systematic review, meta-analysis, and burden estimation study. *The Lancet Global Health*. 2020;8(11):e1427-e34.
23. Taggart C, Roos A, Kadesjö E, Anand A, Li Z, **Doudesis D**, et al. Application of the universal definition of myocardial infarction in clinical practice in scotland and sweden. *JAMA Network Open*, 7(4), e245853-e245853.
24. Li Z, Wereski R, Anand A, Lowry M. T, **Doudesis D**, McDermott M, et al. Uniform or sex-specific cardiac troponin thresholds to rule-out myocardial infarction at presentation. *Journal of the American College of Cardiology* 2024;83(19):1855-66.
25. Bularga A, Taggart C, Mendusic F, Kimenai DM, Wereski R, [...], **Doudesis D**, et al. Assessment of oxygen supply-demand imbalance and outcomes among patients with type 2 myocardial infarction: a secondary analysis of the High-STEACS cluster randomized clinical trial. *JAMA network open*, 5(7), e2220162-e2220162.
26. Taggart C, Monterrubio-Gomez K, Roos A, Boeddinghaus J, Kimenai DM, [...], **Doudesis D**, et al. Improving risk stratification for patients with type 2 myocardial infarction. *Journal of the American College of Cardiology*. 2023;81(2):156-68.(2).
27. Neumann JT, Twerenbold R, Ojeda F, Aldous SJ, Allen BR, [...], **Doudesis D**, et al. Personalized diagnosis in suspected myocardial infarction. *Clinical Research in Cardiology* (2023): 1-14.(1).

* Contributed equally

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