

Sarah C. Goodroe

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SUMMARY

Senior software engineer, applied-ML practitioner, and engineering leader with a PhD in Computational Neuroscience (UCL) who has built computational and machine-learning models since 2018 — from doctoral and postdoctoral research through to production AI and data systems. Founder who solo-built a regulated-lending SaaS platform end-to-end, and a team lead who shipped an ML-driven product with a cross-disciplinary team — equally at home in deep hands-on building and in leading from technical credibility. Comfortable across the full stack (TypeScript/React, Python, PostgreSQL, AWS) and in rigorous statistical and ML modelling, with domain depth in regulated lending, fintech, and climate tech. Based in London; flexible on in-office cadence.

EXPERIENCE

Uparity was founded December 2021 and built alongside the UPenn postdoc (Jan 2022–Mar 2023) and the Airex role (Mar 2023–Dec 2024) before becoming the primary focus. The three roles overlapped; they are not sequential.

Founder & Owner — Uparity — Dec 2021–Present

Greater London, remote

Founded and solo-built **Uparity Hub** end-to-end as primary engineer: a multi-tenant, AI-assisted SaaS Loan Origination System serving 43 Habitat for Humanity affiliates plus a paying ASO partnership — 1,000+ loan applications processed across 800+ users.

- Shipped a full regulated-lending workflow — 15-step intake, document collection and identity verification, front-and-back-end DTI calculation, and FCRA-compliant credit-pull decisioning via an extensible adapter pattern.
- Enforced full ECOA compliance in code, generating the complete adverse-action and disclosure notice suite with regulatory timing windows applied automatically.
- Built a board-governance agentic loop that turns meeting minutes into non-duplicate meetings, action items, motions, and minutes — grounded in organisational context with human-in-the-loop review.
- Built a fund-development prospecting agent that surfaces warm-lead contacts, organisations, and funders for any given campaign goal.
- Built configurable program-screening automation that flags disqualifying items (DTI, property ownership, credit) directly in the intake flow.
- Delivered a six-module platform (homeowner services, website builder, fund-development CRM, events, board portal, paid community/LMS) on a unified cross-module CRM, with Stripe Connect across four revenue streams.
- Engineered the platform on React/TypeScript and Supabase (PostgreSQL with row-level security) on Vercel, sustaining multiple production deploys daily with near-full automated test coverage and no major outages.
- Hired and mentored the Head of Partner Relations through a structured succession, defining pricing strategy and owning all partner and stakeholder communication.
- Trained all 43 affiliate and ASO leadership teams on the platform and Qualified Loan Origination, and presented at the Habitat Georgia 2025 affiliate conference.

Software and Data Science Lead — Airex Technologies — Mar 2023–Dec 2024

London, hybrid (*overlapping with the Uparity build*)

Led a cross-disciplinary team shipping a new ML-driven SaaS product on Airex's smart-airbrick hardware, giving property managers and surveyors visibility on building void health and mould/decay risk; tenure was pre-revenue, delivering free landlord pilots.

- Owned a supervised-learning digital-twin model of floor void health end-to-end — productionised and validated at a 95% confidence interval — trained on 2 years of hourly IoT sensor and weather data across ~1,000 UK properties.

- Embedded a physics-based wood-decay model to forecast near-future mould and decay risk from current sensor readings.
- Directly managed three engineers and a PhD data scientist — owning delivery, growth, and 1:1s — and drove automated test coverage from 0% to 95% in three months.
- Launched the user-facing app in three months on a React/Next.js frontend and a containerised Python (FastAPI/Django) microservice backend with MQTT hardware interfacing.
- Selected as a mid-career leader in the Royal Academy of Engineering Inclusive Leadership Programme, mentoring an early-career leader and embedding inclusive practices across the team.
- Partnered with the executive team and founding engineer on product definition, risk, and roadmap/resource trade-offs; spoke on a DEI panel at Advanced Engineering and presented at a WarmWorks (Scottish Government fuel-poverty programme) partner event.

Postdoctoral Research Scientist (NIH-funded) — University of Pennsylvania — Jan 2022–Mar 2023

Philadelphia, hybrid (*overlapping with the Uparity build*)

NIH-funded postdoc in the Department of Psychology on the neural basis of human navigation and spatial cognition.

- Built a full-stack research application (C# GraphQL backend, JavaScript client, Unity3D/WebGL frontend) and a Python analysis framework run on HPC/cluster infrastructure.
- Designed and led experimental studies across behavioural, neuroimaging (fMRI), and computational methods, recruiting participants online at scale.
- Mentored the lab's Research Assistant/Manager on data collection; published first-author work in PLoS One (2025) and Current Opinion in Neurobiology (2022).

Doctoral Researcher (PhD) — UCL Institute of Behavioural Neuroscience — Sep 2018–Dec 2021

London, on-site

PhD on the neural and behavioural correlates of flexible navigation in complex space.

- Designed and led multiple large-scale studies end-to-end — hypothesis through statistical modelling to publication — reaching ~1,000 users via full-stack research applications (C# on AWS DynamoDB; WebGL/JavaScript; cross-platform).
- Built computational/ML models of behaviour and brain activity (Bayesian inference, reinforcement-learning agents in OpenAI Gym and Unity ML-Agents) to predict behavioural correlates a priori, before collecting any participant data.
- Led a formal collaboration with the Google Maps AR team on spatial-planning prototypes, running design and testing of two AR variants in London (specifics under NDA).
- Lectured undergraduate and graduate Psychology courses and supervised two undergraduate theses; co-author on *Entropy of city street networks linked to future spatial navigation ability* (Nature, 2022).

Research Assistant — T.I. Brown Lab, Georgia Institute of Technology — Sep 2014–Jul 2018

Atlanta, GA (*concurrent with BS degrees*)

- Formal paid Research Assistant in a cognitive neuroscience lab throughout the undergraduate degree; supervised two first-year students and tutored calculus across all four years.
- Co-authored first published work, *The complex nature of hippocampal-striatal interactions in spatial navigation* (Frontiers in Human Neuroscience, 2018).

SKILLS

Languages: TypeScript, JavaScript, Python, C#, SQL (PostgreSQL / PL/pgSQL), MATLAB, R

Frontend: React, Next.js, React Native, Tailwind CSS, TanStack Query, Zustand / Redux, web accessibility (a11y)

Backend & APIs: Node.js, NestJS, Express, FastAPI, Django, Pydantic, REST, GraphQL, gRPC, WebSockets, webhooks, JWT/session auth, RBAC, 2FA/MFA, Stripe Connect, Supabase (Edge Functions, Vault), MQTT

Data & storage: PostgreSQL (RLS, pgTAP), SQLAlchemy, Alembic, Prisma, Drizzle, TimescaleDB, AWS Aurora / DynamoDB / S3, MongoDB, Redis

Infra & cloud: Docker, Vercel CI/CD, GitHub Actions, Terraform, AWS CDK / CloudFormation, multi-tenant SaaS architecture, IoT data pipelines, AWS (EC2, RDS, Lambda, ECS/Fargate, API Gateway,

SQS/SNS/EventBridge, Cognito, IAM, CloudWatch, SageMaker, IoT Core), HPC/cluster computing, Sentry

Testing & quality: pgTAP, Vitest, Playwright, Jest, pytest, 0→95% coverage build-out, CI/CD pipeline ownership, production monitoring

ML, data science & AI: supervised learning (time-series / IoT), Bayesian model inference, reinforcement-learning agents (OpenAI Gym, Unity ML-Agents), AutoML (auto-sklearn), digital-twin and physics-based modelling, agentic AI loops, human-in-the-loop design, LLM / RAG application development, PyTorch / TensorFlow, scikit-learn, pandas, NumPy/SciPy, statsmodels, model validation (cross-validation, 95% CI), end-to-end ML product ownership

Neuroimaging & scientific computing: FSL, nipy, nibabel, DICOM / fMRI pipelines, VR-based experimental design (Unity3D, Blender, WebGL), large-scale dataset handling (Sea Hero Quest)

Domain & compliance: Loan Origination Systems, ECOA & FCRA compliance, DTI underwriting, credit-pull decisioning, Qualified Loan Origination, regulated consumer lending, fintech, CRM design, IoT / building-health analytics, energy efficiency / climate tech, GDPR / data protection

Leadership & process: engineering management, people management (direct reports), hiring and succession planning, mentoring, inclusive leadership (RAEng ILP), Agile PM (APMG Foundation + Practitioner, 2023), product definition and roadmap, stakeholder and exec/partner communication, pricing strategy, cross-disciplinary team leadership, solo full-stack engineering (founder-mode)

EDUCATION

PhD, Computational Neuroscience — UCL — Sep 2018–Dec 2021 · Thesis: *Neural and behavioral correlates of flexible navigation in complex space.*

MSc, Neuroscience — UCL — Aug 2018–May 2019

BS, Psychology and BS, Communication and Media Studies — Georgia Institute of Technology — Sep 2014–Jul 2018 (concurrent dual degree) · Minor in Business Finance, Scheller College of Business.

SELECTED PUBLICATIONS

1. Coutrot A, Manley E, **Goodroe S**, et al. — *Entropy of city street networks linked to future spatial navigation ability* — **Nature** 604, 104–110 (2022). [276 citations]
2. **Goodroe SC**, Starnes J, Brown TI — *The complex nature of hippocampal-striatal interactions in spatial navigation* — **Frontiers in Human Neuroscience** 12, 250 (2018). (*first author*)
3. **Goodroe S**, Fernandez Velasco P, Gahnstrom CJ, et al. — *Predicting real-world navigation performance from a virtual navigation task in older adults* — **PLoS One** 20(1), e0317026 (2025). (*first author*)
4. **Goodroe SC**, Spiers HJ — *Extending neural systems for navigation to hunting behavior* — **Current Opinion in Neurobiology** 73, 102545 (2022). (*first author*)
5. **Goodroe S** — *Neural and behavioral correlates of flexible navigation in complex space* — PhD thesis, UCL (2022). (*sole author*)

Full list of 12 works available on Google Scholar.

CERTIFICATIONS & ASSOCIATIONS

- **Agile Project Management Practitioner and Foundation** — APMG International, Dec 2023
- **Royal Academy of Engineering Inclusive Leadership Programme** — mid-career cohort leader (via Airex Technologies)