

Fatih Çelik

PHYSIOTHERAPIST · NEUROPHYSIOTHERAPIST · NEUROSCIENCE RESEARCHER

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PROFESSIONAL PROFILE

Physiotherapist and neurophysiotherapist with eight years of comprehensive clinical practice across tertiary hospital services, specialised neurorehabilitation, and disability and special-education settings, complemented by graduate research training in neuroscience. My practice is situated at the confluence of evidence-based rehabilitation and the computational study of the nervous system, with sustained emphasis on neuroplasticity-driven recovery, sensorimotor integration, and patient-centred clinical reasoning.

My research trajectory extends this clinical foundation toward the principled and interpretable application of machine learning to neurological prognosis, and toward the integration of computational neuroscience into surgical and rehabilitative decision-making. I conceptualise the human body as an adaptive, learning network and rehabilitation as the deliberate engineering of experience-dependent neural reorganisation — a perspective that unifies my clinical, theoretical, and computational work.

EDUCATION

2021 – Present (Ongoing)

MSc in Neuroscience · *Ege University · Institute of Health Sciences · İzmir*

Graduate research on neurological disorders, with a thesis trajectory directed at the machine-learning-based prediction of disease progression from clinical and neuroimaging data. Advanced coursework spanning physiology of the nervous system, fundamental neuroanatomy, membrane transport and signal transduction, computer-applied biostatistics, neuroimaging techniques, in-vivo behavioural models, biochemical methods, and cognitive neuroscience.

2016 – 2020

BSc in Physiotherapy and Rehabilitation · *Dokuz Eylül University · İzmir*

Professional formation in physiotherapy with a concentration in neurological physiotherapy and evidence-based practice. Coursework encompassed clinical orthopaedic rehabilitation, cardiovascular and pulmonary physical therapy, electrotherapy modalities, pathophysiology, surface anatomy and palpation, physiotherapeutic assessment and analysis, and established hemiplegia rehabilitation paradigms (Bobath, Brunnström, Johnstone, Todd-Davies).

2014 – 2016 (discontinued)

Electrical and Electronics Engineering · *Gaziantep University · Gaziantep*

Two years of rigorous training in physics, programming, and applied mathematics with computer science prior to redirecting toward the health sciences; the quantitative foundation thereby acquired continues to underpin my computational research.

RESEARCH EXPERIENCE & PROJECTS

Ongoing

Mechanistic Interpretability of Neural Systems · *Independent Research*

An advanced research programme directed at reverse-engineering the internal decision mechanisms of artificial neural networks and reconciling them with the organising principles of biological neural computation.

Research Objectives. To characterise the internal features and computational circuits through which deep networks transform inputs into decisions; to establish principled correspondences between these learned representations and neuroscientific theories of neural coding; and to inform the design of trustworthy, explainable artificial-intelligence (XAI) architectures suitable for high-stakes clinical deployment.

Methodologies. Feature attribution and saliency analysis, circuit-level decomposition, sparse feature and dictionary-learning methods, activation and representation probing, and systematic ablation, integrated with a comparative mapping onto sensorimotor and predictive-coding frameworks.

Expected Outcomes. Clinical prediction models whose prognoses can be interrogated rather than merely trusted; a methodological bridge between systems neuroscience and machine interpretability; and a measurable reduction of black-box risk in computational clinical decision support.

Ongoing

Digital Neurosurgery · *Research & Development*

An innovative research-and-development initiative aimed at integrating computational-neuroscience methods and brain-computer interfaces (BCI) into neurosurgical planning, pre-operative simulation, and neural data modelling.

Research Objectives. To develop patient-specific computational models of neural structure and dynamics that support pre-operative planning and risk stratification; to incorporate BCI-derived functional signals into the characterisation of eloquent cortex; and to formalise a translational pipeline extending from computational neuroscience to operative decision support.

Methodologies. Patient-specific anatomical and dynamical modelling, multimodal neuroimaging integration, simulation of neural dynamics, BCI signal acquisition and decoding, and uncertainty-aware predictive modelling.

Expected Outcomes. Pre-operative simulation and planning tools that augment surgical decision-making; quantitative frameworks for functional-risk assessment; and a reproducible methodology for embedding computational neuroscience within the neurosurgical workflow.

2022 – 2023

A Mathematical Framework for Brain Dynamics · *Ege University · Graduate Project*

Developed a mathematical framework for neural-circuit function and the biophysics of synaptic plasticity, integrating experimental data with theoretical models to elucidate the mechanisms underlying brain function and dysfunction.

2022

Machine-Learning Prediction of Disease Progression · *Ege University · Graduate Project*

Applied supervised machine-learning methods to magnetic-resonance imaging data to model the progression of neurological disease — encompassing data processing, quantitative analysis, and visualisation — as an early step toward clinically legible, rather than opaque, predictive instruments.

CLINICAL EXPERIENCE

2026 · MAR – PRESENT

Physiotherapist · *Private Clinical Practice, İzmir*

Independent provision of physiotherapy and neurorehabilitation, conducting comprehensive movement assessment and clinical reasoning to formulate individualised, evidence-based treatment plans for neurological, orthopaedic, and musculoskeletal presentations, with sustained emphasis on functional restoration and long-term self-management.

2024 · AUG – 2026 · FEB

Physiotherapist · *DMA Sensory-Motor Perception Special Education & Rehabilitation Centre, Diyarbakır*

Delivered paediatric and adult neurorehabilitation centred on sensorimotor integration, designing and progressing individualised therapeutic programmes for a clinically heterogeneous caseload through standardised assessment, neurodevelopmental treatment principles, and structured family education.

2024 · MAR – JUL

Physiotherapist · *Tınaztepe Torbalı Hospital, İzmir*

Provided hospital-based assessment and intervention across the clinical pathway, applying clinical reasoning to characterise movement dysfunction and delivering therapeutic exercise, manual therapy, and electrotherapy within personalised plans in close interdisciplinary coordination with physicians, nursing, and occupational therapy.

2024 · JAN – FEB

Physiotherapist · *Soğukçeşme Special Education & Rehabilitation Centre, İzmir*

Diagnosed movement impairment through standardised testing and established SMART rehabilitation goals with patients, families, and interdisciplinary teams, implementing evidence-based interventions including neuromuscular re-education, therapeutic exercise, manual therapy, and hydrotherapy.

2022 · APR – 2024 · JAN

Physiotherapist · *Toren Disabled Care Centre, İzmir*

Conducted comprehensive assessment of individuals with complex disabilities and developed individualised plans deploying adaptive devices, orthoses, and assistive technology to maximise independence and quality of life, with family education and patient advocacy as integral functions of the role.

2022 · JAN – APR

Physiotherapist · *Borfiz Physical Therapy & Rehabilitation Medical Centre, İzmir*

Provided outpatient musculoskeletal and rehabilitative care under rigorous clinical governance, maintaining meticulous documentation and strict adherence to clinical standards while advancing professional development through continuing education.

2020 · JUL – 2021 · DEC

Independent Physiotherapist · *Freelance Private Practice, İzmir*

Maintained independent one-to-one practice across a varied caseload, constructing individualised evidence-based programmes targeting mobility, strength, flexibility, and functional independence, integrated with pain management, injury-prevention, and ergonomic education.

2019 · JUL – 2020 · JUL

Intern Physiotherapist · *Dokuz Eylül University Hospital, İzmir*

Assisted licensed physiotherapists in tertiary-hospital assessment – history-taking, physical examination, and the administration of standardised tests of movement, strength, and function – while consolidating assessment technique and clinical interaction skills.

2018 · DEC – 2019 · JUN

Intern Physiotherapist · *Özel Artı Bakış Special Education & Rehabilitation Centre, İzmir*

Monitored rehabilitation outcomes through objective measures and patient-reported feedback, adjusting treatment plans across rehabilitation phases and supporting discharge planning, home exercise programmes, and community integration.

2018 · JUL – DEC

Intern Physiotherapist · *Özel Balçova Physical Therapy & Rehabilitation Centre, İzmir*

Practised within established standards of professional conduct – integrity, empathy, and cultural sensitivity – and advocated for patients' rights and preferences throughout the rehabilitation process.

2017 · DEC – 2018 · MAY

Intern Physiotherapist · *Dokuz Eylül University Hospital, İzmir*

Completed a foundational clinical rotation, documenting patient progress, interventions, and outcomes to regulatory standards under senior supervision and adapting across diverse patient populations to build well-rounded clinical experience.

AREAS OF EXPERTISE

Clinical Competencies. Movement assessment and differential diagnosis · treatment planning and implementation · manual therapy · therapeutic exercise · electrotherapy · pain management

Neurorehabilitation. Neurophysiotherapy · neuroplasticity-based recovery · sensorimotor integration · paediatric and adult neurorehabilitation · hemiplegia paradigms (Bobath, Brunnström, Johnstone, Todd-Davies)

Computational & Research Methods. Machine learning · neuroimaging (MRI) analysis · applied biostatistics · data processing and visualisation · mathematical modelling · mechanistic interpretability and explainable AI

Professional. Evidence-based practice · patient-centred care · interdisciplinary collaboration · patient and family education · clinical documentation · continuous professional development

LICENCES & CERTIFICATIONS

Manual Therapy Certification (MCT) – University of St. Augustine for Health Sciences

Medical Neuroscience – Duke University

Fundamental Neuroscience for Neuroimaging – Johns Hopkins University

Understanding the Brain: The Neurobiology of Everyday Life – The University of Chicago

Human Anatomy & Physiology Specialization – Rice University

Vital Signs: Understanding What the Body Is Telling Us – University of Pennsylvania

Science of Exercise – University of Colorado Boulder

ACHIEVEMENTS

Graduate Record Examinations (GRE) – 319/340 · 2021

Test of English as a Foreign Language (TOEFL iBT) – 102/120 · 2021

LANGUAGES

English – Professional proficiency · Turkish – Native proficiency

INTERESTS

Literature · photography · the culinary arts · hiking and nature exploration · visual and applied crafts

References available upon request.