Davide Valeriani, PhD

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Engineer and scientist with 10+ years of experience in analyzing body signals from brain (EEG/fMRI), eyes, heart and muscles, and developing machine learning algorithms for medical, defense, and consumer applications. Advocate of explainable artificial intelligence. Strong coding, communication and management skills.

WORK EXPERIENCE

Data Science Tech Lead
08/2023 - now
WHOOP Inc. - Boston, MA, USA

- Owner of sleep algorithms and products
- Building a team of data scientists to grow product offering in the sleep domain
- Managing and mentoring 2 FTE direct reports

Senior Research Scientist
10/2022 - 08/2023
Google LLC - Cambridge, MA, USA

- Led R&D of machine learning algorithms for estimating cardiovascular health from wearable sensors
- Analyzed health data at scale (25M+ users)
- Published 2 abstracts in top conferences (AHA, BSN)

Lead Data Scientist
2/2021 - 10/2022
Neurable Inc. - Boston, MA, USA

- Developed signal processing and machine learning pipeline to estimate focus from EEG signals
- Implemented REST APIs and three successful prototypes for focus visualization in real-time
- Manager of engineering team (5 FTE)

Postdoctoral Research Fellow
9/2018 - 2/2021
Harvard Medical School - Boston, MA, USA

- Developed a deep learning algorithm for diagnosing dystonia from brain MRI data, significantly improving diagnostic accuracy (99%) and time to diagnosis (5s)
- Researched neural representations of speech production via estimation of effective brain connectivity from fMRI data through dynamic causal modeling
- Implemented EEG/fMRI protocol to develop and validate multimodal brain-computer interfaces

Senior Research Officer
2/2017 - 8/2018
University of Essex - Colchester, UK

- Developed and validated framework to use brain-computer interfaces to facilitate integration between human and AI agents in face recognition
- Trained research lab at University of Southern California on collecting data from high-density EEG systems

Lecturer
10/2017 - 12/2017
University of Essex - Colchester, UK

- Taught course Large Scale Software Systems and Extreme Programming through classes and lab activities
- Received high ratings from students

EDUCATION

Certificate in Systems Design
2021
Cornell University, Ithaca, NY, USA

Ph.D. Computing and Electronic Systems
2017
University of Essex, Colchester, UK

Thesis: *Improving group decision making with collaborative brain-computer interfaces*

M.Sc. Computer Engineering *cum laude*
2013
University of Parma, Parma, Italy

Dissertation: *A 3D perception system for mobile robot navigation and object detection*

B.Sc. Computer Engineering *cum laude*
2010
University of Parma, Parma, Italy

Dissertation: *Development of a software library for programming the Comau Smart Six robot manipulator*

TECHNICAL SKILLS

Programming Languages
Python (numpy, scipy, sklearn, pandas, matplotlib), Matlab, R, C++, Java, Javascript, HTML/CSS

Software Engineering
Test-driven development, object-oriented programming, Git, SVN, MLOps, REST API, system design

Machine Learning
Classification, regression, convolutional neural network, deep learning, MLflow, MLOps, Tensorflow, Keras

Project Management
Agile, communication, organization, flexibility, planning

Neuroscience
EEG, fMRI, preprocessing, feature extraction, statistics

Research
Grant writing, experimental design, data collection, data analysis, presentation of results, supervision of trainees

HOBBIES & INTERESTS

Bonsai   Photo   Diving   Cooking   Traveling

SELECTED PUBLICATIONS

For a full list, see Google Scholar.

Valeriani D, Cecotti H, Thelen A, Herff C (2023). *Editorial: Translational brain-computer interfaces: From research labs to the market and back.* Frontiers in Human Neuroscience.

Valeriani D, O'Flynn LC, Worthley A, Hamzehei Sichani A, Simonyan K (2022). *Multimodal collaborative brain-computer interfaces aid human-machine team decision-making in a pandemic scenario*. J. Neural Eng.

Valeriani D, Santoro F, Ienca M (2022). *The present and future of neural interfaces*. Frontiers in Neurorobotics.

Simonyan K, Ehrlich SK, Andersen R, Brumberg J, Guenther F, Hallett M, Howard MA, Millán JDR, Reilly RB, Schultz T, **Valeriani D** (2022). *Brain-Computer Interfaces for Treatment of Focal Dystonia*. Movement Disorders.

Salvatore C, **Valeriani D**, Piccialli V, Bianchi L (2022). *Optimized collaborative brain-computer interfaces for enhancing face recognition*. IEEE Trans. Neural Syst. Rehabil. Eng.

Valeriani D, Ayaz H, Kosmyna N, Poli R, Maes P (2021). *Editorial: Neurotechnologies for human augmentation.* Frontiers in Neuroscience.

Valeriani D, Simonyan K (2021). *The dynamic connectome of speech control.* Phil. Trans. Royal Society B

Antonietti A, Balachandran P, Hossaini A, Hu Y, **Valeriani D** (2021). *The BCI Glossary: a first proposal for a community review.* Brain-Computer Interfaces.

Bhattacharyya S, **Valeriani D**, Cinel C, Citi L, Poli R (2021). *Anytime collaborative brain-computer interfaces for enhancing perceptual group decision-making*. Scientific Reports.

Fernandez-Vargas J, Tremmel C, **Valeriani D**, Bhattacharyya S, Cinel C, Citi L, Poli R (2021). *Subject- and task-independent neural correlates and prediction of decision confidence in perceptual decision making*. J. Neural Eng.

Valeriani D, Simonyan K (2020). *A microstructural neural network biomarker for dystonia diagnosis identified by a DystoniaNet deep learning platform*. Proc. Natl. Acad. Sci. U.S.A.

Valeriani D, Poli R (2019). *Cyborg groups enhance face recognition in crowded environments.* PLoS One.

Cinel C, **Valeriani D**, Poli R (2019). *Neurotechnologies for human cognitive augmentation: current state of the art and future prospects*. Frontiers in Human Neuroscience.

Valeriani D, Cinel C, Poli R (2017). *Group augmentation in realistic visual-search decisions via a hybrid brain-computer interface*. Scientific Reports.

Valeriani D, Poli R, Cinel C (2016). *Enhancement of group perception via a collaborative brain-computer interface*. IEEE Trans. Biomed. Eng.

Valeriani D, Matran-Fernandez A (2015). *Towards a wearable device for controlling a smartphone with eye winks*. 7th Computer Science and Electronic Engineering Conference.

PROJECTS & LEADERSHIP

Board Member and Committee Chair *2020 - now*
BCI Society

- Proposed, organized and led Postdoc and Student Committee to organize initiatives for BCI trainees
- Increased society membership by 30% in one year
- Implemented policies to promote diversity

Co-Founder and Director *2015 - 2020*
EyeWink Ltd.

- Pitched an idea and led development of prototype device to control smartphone with eye movements at HackTheBrain hackathon
- Raised £4,605 through crowdfunding and £15,000 of venture capital to fund development
- Published conference paper and presented tech at two exhibitions in the London Science Museum

Lead Guest Editor *2020 - 2021*
Frontiers in Neuroscience - Neural Technology

- Led a peer-reviewed article collection on neurotechnologies for human augmentation
- 13 articles published, over 100,000 views received
- First author of e-book produced at the end of the project

SELECTED AWARDS

Study UK Alumni Award: Innovation *2022*
British Council

Best Poster Award: Non-Invasive BCI *2021*
BCI Society

Abstract Award *2020*
2nd Annual Computational Data Neuroscience Symposium

Radcliffe Exploratory Seminar Award *2020*
Radcliffe Institute at Harvard University

OHBM People's Choice Abstract Award *2019*
Organization for Human Brain Mapping

Bronze Medal *2016*
Cybathlon BCI Race

Best Paper Award *2015*
7th IEEE EMBS Neural Engineering Conference

London Science Museum Award *2015*
HackTheBrain UK

Best Paper Award *2015*
4th International Conference on Robotics in Education

Winner *2012*
Sick Robot Day robotic competition