Glossary

The following glossary entries are primarily intended to provide an overview of technical and functional aspects of concepts rather than analytical ones.

Algorithm	A structured set of instructions, typically in the form of steps, designed to solve a specific problem that can be implemented using programming languages to be executed as part of computer code.
AlphaFold	An **artificial intelligence** system for predicting protein folding, developed by the British-American company and Alphabet subsidiary DeepMind.
Artificial General Intelligence (AGI)	Broadly understood as **artificial intelligence** that performs a wide and generic range of tasks and behaviors at levels that are considered to be equal to or greater than that of humans. Its feasibility remains a subject of active debate.
Artificial Intelligence (AI)	Describes the broad field of research aimed at building "intelligent" machines. It consists of broad subsets or techniques such as **machine learning**, **deep learning**, natural language processing, reinforcement learning, computer vision, robotics, and expert systems.
Convolutional Neural Network (CNN)	A form of **deep neural network**, sometimes also referred to as **deep learning**, for processing data with a grid-like structure and non-local features. CNNs are frequently used in the field of computer vision, where they leverage chains of convolutional filters to automatically extract features from images at various levels of detail.
Deep Learning (DL)	Any form of **machine learning** that makes use of **deep neural networks**. *Cf.* **CNN.**
Deep Neural Network	A **neural network** with two or more layers.
Fluorescence microscopy	An imaging technique in which expressed fluorescent proteins or administered small molecule fluorophores are excited at a specific wavelength and emit a photon of a defined higher wavelength on recovery to their energy ground state.

Human Computation (HC)	In its current understanding, HC dates from the beginning of the twenty-first century and describes an interdisciplinary area of research that its advocates situate within the research field of **artificial intelligence**. HC addresses problems that cannot be solved by current **artificial intelligence** technologies or manual human approaches alone by combining the strengths of humans and machines to achieve superior capabilities. The term HC is sometimes used synonymously with **hybrid intelligence**.
Hybrid Intelligence (HI)	An emerging research field that focuses on the development of hybrid systems of humans and **artificial intelligence**, which are often considered to improve by learning from each other. The term is sometimes used synonymously with **human computation**.
Large Language Model (LLM)	A type of **deep neural network** trained on large amounts of text data to predict sequences of words, thereby building a model of the language. They are often able to generate output that resembles text produced by humans.
Machine Learning (ML)	Describes a subset or technique of **artificial intelligence** in which algorithmic prediction or decision models are built from large amounts of data without directly programmed instructions.
MATLAB	A programming language and platform for programming and numeric computation developed and owned by the private company MathWorks.
Multiphoton microscopy	A form of **fluorescence microscopy** in which multiple photons of lower energy are used to achieve excitation of the fluorophores. Cf. **two-photon microscopy**.
Neural Network (NN)	An NN combines different mathematical operations, whose composition is described by a directed acyclic graph, to form a complex parameterized function. Most often, this function simply consists of a linear chain of multiplications of so-called "weights matrices" with subsequent application of so-called "activation functions." The different components in the chain are also called "layers." A key component of a neural network is that its parameters (or weights) are "trainable," i.e., they are initialized to random values and then gradually optimized by applying the network to training data (inputs and expected outputs), iteratively updating the weights to improve the network's performance in mapping the inputs to the expected outputs, for example via gradient descent techniques.
Python	A widely used high-level programming language for web development, data analysis, **artificial intelligence**, and other applications.
Rosetta	A protein modeling and protein structure analysis software first developed by the Baker Lab of the Institute for Protein Design at the University of Washington. Today, it is developed and maintained by the members of the RosettaCommons collaborative, which includes academic institutes, government laboratories, and partner corporations.
RoseTTAfold	An advanced **deep learning**–based model that was developed by the Institute for Protein Design at the University of Washington.
Two-photon microscopy	A form of **fluorescence microscopy** in which two photons of lower energy, such as near-infrared light, are used to achieve excitation of the fluorophores. The use of low-energy near-infrared light, as well as the good tissue penetration of red light, allows for the imaging of thick specimens and even living tissue.
Voxel	A volumetric (3D) pixel depicting a digital value on a grid in 3D space.