

**The Faculty of Science**  
awards

**Maria Paula Vazquez Pianzola**

born on September 15, 1974

the

**Certificate of Advanced Studies in  
Applied Data Science  
(CAS ADS Unibe)**

**University of Bern**

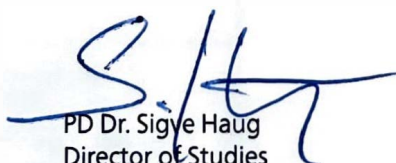
Bern, July 17, 2024



Prof. Dr. Marco Herwegh  
Dean, Faculty of Science



Prof. Dr. Thomas Wihler,  
Chair Program Management



PD Dr. Sigve Haug  
Director of Studies

## Transcript of Records

### Certificate of Advanced Studies in Applied Data Science (CAS ADS) 16 ECTS credits

#### CAS Applied Data Science

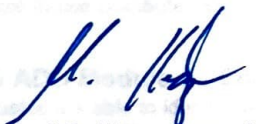
Subject	Lecturer	Date	ECTS	Grade
<b>Modules</b>				
CAS ADS Module 2 - Statistical Inference for Data Science	Haug	10.10.2023	2.00	Pass
CAS ADS Module 3 - Data analysis and Machine Learning	Vladymyrov	04.12.2023	2.00	Pass
CAS ADS Module 1 - Data Acquisition and Management	Haug, Brännler, Jakob, Heinrich	15.12.2023	2.00	Pass
CAS ADS Module 4 - Ethics and Best Practices	Haug, Seitz, Suzanna, Alhineidi, Yurovsky	03.01.2024	2.00	Pass
CAS ADS Module 5 - Consolidations and Electives	Haug	08.02.2024	2.00	Pass
CAS ADS Module 6 - Deep Learning	Haug, Vladymyrov	26.03.2024	2.00	Pass
<b>CAS Project Work</b>				
CAS ADS - Project Work	Haug	15.07.2024	4.00	Pass
<b>Credits to be taken into account:</b>			<b>16.00</b>	


#### 7. Beurkundung des Diploma Supplement / Certification of the Diploma Supplement

##### 7.1 Datum / Date

17. Juli 2024 / July 17, 2024

##### 7.2 Unterschrift(en) / Signature(s)

  
Prof. Dr. Marco Herwegh  
Dean, Faculty of Science

  
Prof. Dr. Thomas Wihler,  
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PD Dr. Sigve Haug  
Director of Studies

##### 7.3 Dekan(e)/Dekanin(nen) / Dean(s)

Prof. Dr. Marco Herwegh, Dean, Faculty of Science

##### 7.4 Stempel / Seal



# Learning Outcomes

## Profile of the study programme

### Certificate of Advanced Studies in Applied Data Science (CAS ADS) 16 ECTS credits

#### CAS Applied Data Science

##### Modules

##### **CAS ADS Module 2 - Statistical Inference for Data Science**

Graduates know the importance of statistical inference for data science and where to apply it, they understand the theoretical concepts (probabilities and distributions, significance and p-values, estimation paradigms, uncertainty measures - standard errors, confidence limits and intervals, hypothesis testing - null and working hypotheses, classification and clustering), they can apply the theoretical concepts with software (Python, R, ROOT, etc) on (own) data, they can draw scientific conclusions from statistical analysis results.

##### **CAS ADS Module 3 - Data analysis and Machine Learning**

Graduates know about uni- and multivariate methods for classification, discrimination and clustering, understand different models for supervised, unsupervised and reinforced learning, they can apply software for deep learning (course software is TensorFlow).

##### **CAS ADS Module 1 - Data Acquisition and Management**

Graduates know data sources, types, sizes, storage systems, typical infrastructures, databasis, data management, typical data management requirements, are able to analyse environments with data taking sensors with respect to data management needs, can design data management plans and do plotting with Python.

##### **CAS ADS Module 4 - Ethics and Best Practices**

Graduates know about ethical questions in scientific computing and data science. They are able to discuss the ethical questions in the context of philosophy of science. They know best practices for scientific computing. They will know about security issues. They understand and are able to use distributed Version Control Software (VCS). They will document and publish software projects with VCS and websites.

##### **CAS ADS Module 5 - Consolidations and Electives**

Graduates are able to identify, analyse, discuss and communicate data science challenges. They know actual data science challenges outside own domain. They are able to apply a number of data science tools and methods, e.g. CVS (Control Version Systems, git) and documentation.

##### **CAS ADS Module 6 - Deep Learning**

Graduates will understand different models for supervised, unsupervised and reinforced learning; be able to apply software for deep learning (course software is TensorFlow); be able to train, tune and assess deep networks.

##### **CAS Project Work**

##### **CAS ADS - Project Work**

Participant teams perform and present a comprehensive data science project based on all six CAS modules.