

**201905 FRIB TA Summer School - Machine Learning Applied to Nuclear Physics
Facility for Rare Isotope Beams (FRIB)
20-23 May 2019**

AGENDA

Start	Duration	Agenda Item	Discussion Leader
Monday, 20 May 2019 - 1200 FRIB Laboratory			
8:00 AM	0:30	01 Welcome and Registration	
8:30 AM	1:00	02 Introduction to Machine Learning and Various Python Packages	M. Hjorth-Jensen
9:30 AM	1:00	03 Linear Regressions	M. Hjorth-Jensen
10:30 AM	0:30	<i>Break</i>	
11:00 AM	1:00	04 Logistic Regression	M. Hjorth-Jensen
12:00 PM	1:00	<i>Lunch</i>	
1:00 PM	1:00	05 Optimization of Functions, Gradient Descent and Stochastic Gradient Descent	M. Hjorth-Jensen
2:00 PM	1:00	06 Decision Trees and Random Forests	M. Hjorth-Jensen
3:00 PM	0:30	<i>Break</i>	
3:30 PM	2:30	07 Hands-On Sessions with Selected Physics Examples	
6:00 PM		Adjourn	
Tuesday, 21 May 2019 - 1200 FRIB Laboratory			
8:30 AM	1:00	01 Neural Networks	M. Kuchera R. Ramanujan
9:30 AM	1:00	02 Neural Networks and Deep Learning	M. Kuchera R. Ramanujan
10:30 AM	0:30	<i>Break</i>	
11:00 AM	1:00	03 Convolutional Neural Networks (CNNs) and Examples from Nuclear Physics Experiments	M. Kuchera R. Ramanujan
12:00 PM	1:00	<i>Lunch</i>	
1:00 PM	1:00	04 CNNs	M. Kuchera R. Ramanujan
2:00 PM	1:00	05 Autoencoders and Recurrent Neural Networks and Examples from Nuclear Physics Experiments	M. Kuchera R. Ramanujan
3:00 PM	0:30	<i>Break</i>	
3:30 PM	2:30	06 Hands-On Sessions with Examples from Nuclear Physics Experiments	
6:00 PM		Adjourn	



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Start	Duration	Agenda Item	Discussion Leader
Wednesday, 22 May 2019 - 1200 FRIB Laboratory			
8:30 AM	1:00	01 Reinforcement Learning	M. Kuchera
9:30 AM	1:00	02 Introduction to Exploratory Data Analysis and Unsupervised Learning: PCA	M. Hirn
10:30 AM	0:30	<i>Break</i>	
11:00 AM	1:00	03 Clustering and Introduction to Nonlinear Dimension Reduction: k-means and t-SNE	M. Hirn
12:00 PM	1:00	<i>Lunch</i>	
1:00 PM	1:00	04 Nonlinear Dimension Reduction: Spectral Graph Theory and Manifold Learning	M. Hirn
2:00 PM	1:00	05 Boltzmann Machines and Many-Body Problems	M. Hjorth-Jensen
3:00 PM	0:30	<i>Break</i>	
3:30 PM	2:30	06 Hands-On Sessions with Various Examples	
6:00 PM		Adjourn	
7:00 PM		Group dinner - Location TBD	

Thursday, 23 May 2019 - 1200 FRIB Laboratory

9:00 AM	1:00	01 Current State of Machine Learning Research	M. Kuchera
10:00 AM	0:30	02 Hands-On Sessions with Examples from Nuclear Physics, Experiment and Theory	
10:30 AM	0:30	<i>Break</i>	
11:00 AM	1:00	03 Hands-On Sessions with Examples from Nuclear Physics, Experiment and Theory	
12:00 PM	1:00	<i>Lunch</i>	
1:00 PM	2:00	04 Hands-On Sessions with Examples from Nuclear Physics, Experiment and Theory	
3:00 PM	0:30	<i>Break</i>	
3:30 PM	1:30	05 Hands-On Sessions with Examples from Nuclear Physics, Experiment and Theory	
5:00 PM		Adjourn	

