



Venice International University
VIU Summer School
Exploring Nucleic Acids: from biophysics to molecular biology

September 22-26, 2025

Faculty

Claudia Sissi, University of Padova
Riccardo Rigo, University of Padova
Francesco Mantegazza, University of Milano-Bicocca
Elisabetta Groaz, KU Leuven
Jurij Lah, University of Ljubljana
Caterina Carraro, German Center for Neurodegenerative Diseases
Lukas Trantirek, Central European Institute of Technology of Masaryk University
Leonard Prins, University of Padova

Program

Monday, September 22

9:00 - 9:30 Registration and Welcome remarks

9:30 – 11:00: STRUCTURAL FEATURES OF NUCLEIC ACIDS (Prof. Riccardo Rigo)

11:00- 11:30 Coffee break

11:30 – 12:30: STRUCTURAL CHARACTERIZATION OF NUCLEIC ACIDS IN VITRO: METHODS AND CRITICAL ASPECTS (Prof. Lukas Trantirek)

12:30 – 14:00 Lunch

14:00 – 16:00: STRUCTURAL CHARACTERIZATION OF NUCLEIC ACIDS IN CELLS: METHODS AND CRITICAL ASPECTS (Prof. Lukas Trantirek)

16:00 – 17:00 Break

17:00 – 18:00 One-to-one discussion with experts

Tuesday, September 23

9:30 - 10:45: BIOPHYSICS OF NUCLEIC ACIDS: THERMODYNAMIC ANALYSIS
(Prof. Jurij Lah)

10:45 - 11:15 Coffee break

11:15 – 12:30: BIOPHYSICS OF NUCLEIC ACIDS: THERMODYNAMIC ANALYSIS (Prof. Jurij Lah)

12:30 – 14:00 Lunch

14:00 – 16:30: BIOPHYSICS OF NUCLEIC ACIDS: SINGLE-MOLECULE APPROACHES (Prof. Francesco Mantegazza)

16:30 – 17:00 Break

17:00 – 18:00 One-to-one discussion with experts

Evening Social Dinner in Venice (tbd)

Wednesday, September 24

9:30 – 11:00: NUCLEIC ACIDS IN MEDICINAL CHEMISTRY: PHARMACEUTICAL TARGETS (Prof. Claudia Sissi)

11:00 -11:30 Coffee break

11:30 – 13:00: NUCLEIC ACIDS IN MEDICINAL CHEMISTRY: DRUGS (Prof. Elisabetta Groaz)

13:00 – 14:00 Lunch

Free afternoon or site visit

Thursday, September 25

9:30 - 10:45: HIGH-DIMENSIONAL ANALYSIS OF NUCLEIC ACIDS: THEORETICAL INTRODUCTION
(Prof. Caterina Carraro)

10:45 - 11:15 Coffee break

11:15 – 12:30: HIGH-DIMENSIONAL ANALYSIS OF NUCLEIC ACIDS: THEORETICAL INTRODUCTION
(Prof. Caterina Carraro)

12:30 – 14:00 Lunch

14:00 – 17:00 HIGH-DIMENSIONAL ANALYSIS OF NUCLEIC ACIDS: PRACTICAL SESSION (Prof. Caterina Carraro)

17:30 – 18:30 One-to-one discussion with experts

Friday, September 26

9:30 – 11:00: NUCLEIC ACID-BASED NANOTECHNOLOGIES (Prof. Leonard Prins)

11:00 - 11:30 Coffee break

11:30 – 13:00: NUCLEIC ACID-BASED NANOTECHNOLOGIES (Prof. Leonard Prins)

13:00 – 14:00 Lunch

15:00-16:00 FINAL TEST

16:30 – 18:00 One-to-one discussion with experts and concluding remarks

Faculty's short bio



Claudia Sissi is a Full Professor at the Department of Pharmaceutical and Pharmacological Sciences at the University of Padova. Her main research focus concerns the quantitative analysis of the interactions between biological macromolecules (proteins, polysaccharide, nucleic acids) with small ligands presenting potential pharmacological activity. Currently, she is actively involved in defining the molecular basis of selective recognition of nucleic acid by small molecules with particular attention toward different DNA folding. At

the same time she is interested in the molecular basis of Topoisomerases mechanisms of action to identify novel approaches useful to draw novel antibacterial/anticancer drugs. Her main experience concerns spectroscopic and molecular-biology techniques.



Riccardo Rigo is a Researcher in the Department of Pharmaceutical and Pharmacological Sciences at the University of Padova. His primary research interests include the study of non-canonical nucleic acid structures and nucleic acid-binding proteins as potential pharmaceutical targets. He also explores their roles in fundamental biological processes and disease mechanisms. Additionally, he focuses on the discovery and development of small molecule drugs with potential antiviral and antitumor activity, designed to interact with these targets.



Francesco Mantegazza is a Professor in the School of Medicine and Surgery at the University of Milano-Bicocca. His scientific research activity is devoted to the experimental study of the nanomechanical properties of single molecules and single cells or tissues. The objective is providing quantitative information about complex and unknown relevant biophysical issues, such as DNA compaction inside nucleus, surface elasticity of cancer or healthy cells or tissues, DNA superstructures, and conformation of intrinsically disordered proteins.



Elisabetta Groaz is a Research Expert Rega Institute for Medical Research in KU Leuven. Her research aims to explore uncharted biological functions driven or encoded by non-natural nucleoside and nucleic acid analogues. It pursues the disruptive design of (bio)chemical tools with the inherent potential of introducing means and capabilities to both drug discovery and biotechnology that up to now were largely considered impracticable. This extends from synthetic molecules that can act as inactive precursors of therapeutic agents to others that may function as substrates of processing enzymes such as polymerases or act as catalysts in cellular

metabolism.



Jurij Lah is Professor of Physical Chemistry at the Faculty of Chemistry and Chemical Technology, University of Ljubljana. His research interests include: thermodynamic stability, interactions and structural features of biologically important molecules in relation to their function. Recently, his research has focused on the description of the behaviour of non-canonical nucleic acids and intrinsically disordered proteins.



Caterina Carraro is a postdoctoral researcher at the German Center for Neurodegenerative Diseases (DZNE), Department of Systems Medicine, Bonn and Uniklinikum Bonn (UKB). She has a bachelor's degree in Biotechnologies, at Department of Biology, a master's Degree in Pharmaceutical Biotechnologies (summa cum laude) at Department of Pharmaceutical and Pharmacological Sciences and a Ph.D. in Molecular Sciences (Pharmaceutical Curriculum) obtained at the University of Padova. Her current research is focused on the use of multi-omics approaches in drug discovery and in clinical studies, applied to diverse pathological settings including cancer and neurodegeneration.



Lukas Trantirek is the head of the “Non-Coding Genome” research group at the Central European Institute of Technology of Masaryk University (CEITEC MU) in Brno, Czech Republic. He completed his PhD in organic chemistry at Masaryk University in Brno and subsequently gained international experience through postdoctoral fellowships at the University of California in Los Angeles, USA, and Johannes Kepler University in Linz, Austria. Between 2009 and 2015, he worked as a visiting associate professor at Utrecht University in the Netherlands. He focuses on cellular structural biology of nucleic acids using NMR spectroscopy.



Leonard J. Prins is a full professor of Organic Chemistry in the Department of Chemical Sciences at the University of Padova. He obtained his PhD-degree from the University of Twente, Netherlands with prof. David Reinhoudt in 2001. After postdoctoral research with prof. Peter Dervan at Caltech, Pasadena, USA and prof. Giulia Licini at the University of Padova, Italy he started his independent career in 2004 in Padova. His current research interests are chemical network reactivity, and non-equilibrium self-assembly and dissipative DNA nanotechnology.