UNIVERSITÀ DEGLI STUDI DI TRIESTE

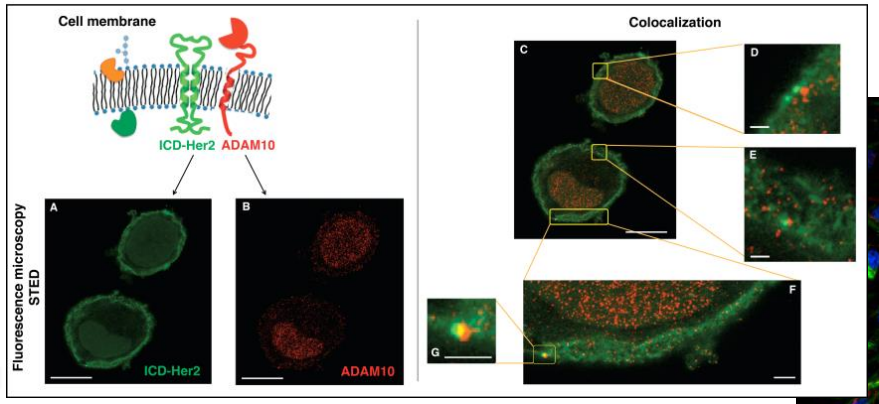
PhD program in NANOTECHNOLOGY

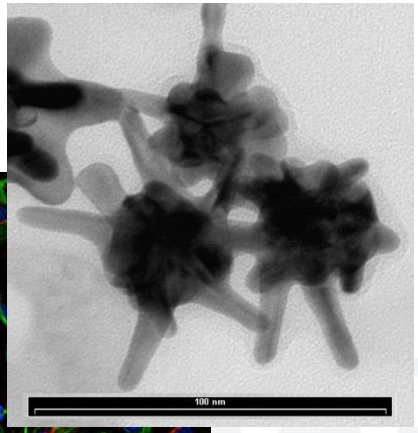
https://web.units.it/dottorato/nanotecnologie/

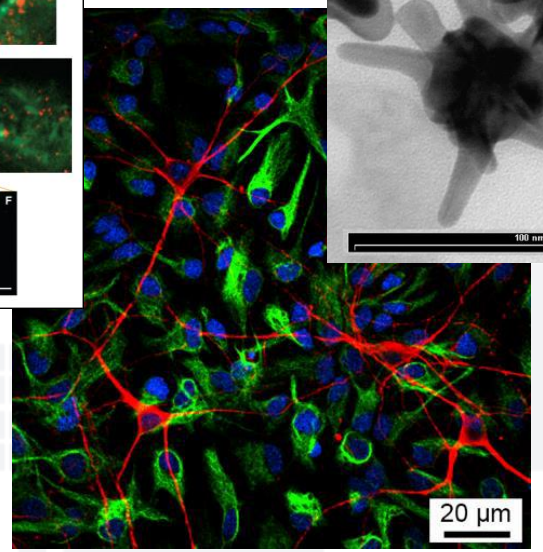
Coordinator: Alberto Morgante
Deputy-coordinator: Paola Posocco
AY 2023-2024

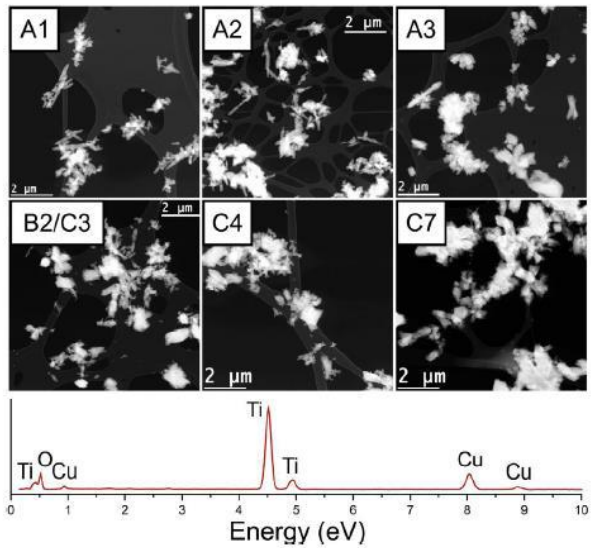
MISSION

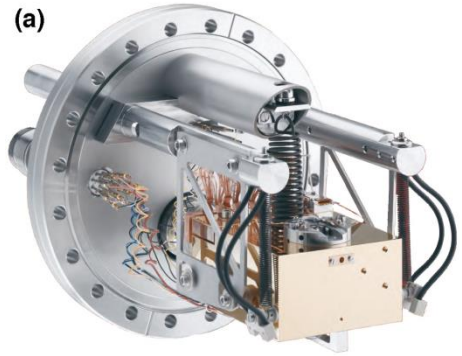
- To provide students with knowledge and training in the field of nanotechnology
- To provide the necessary background to become 21st century scientists and technologists

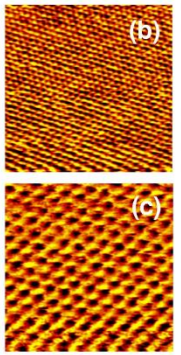










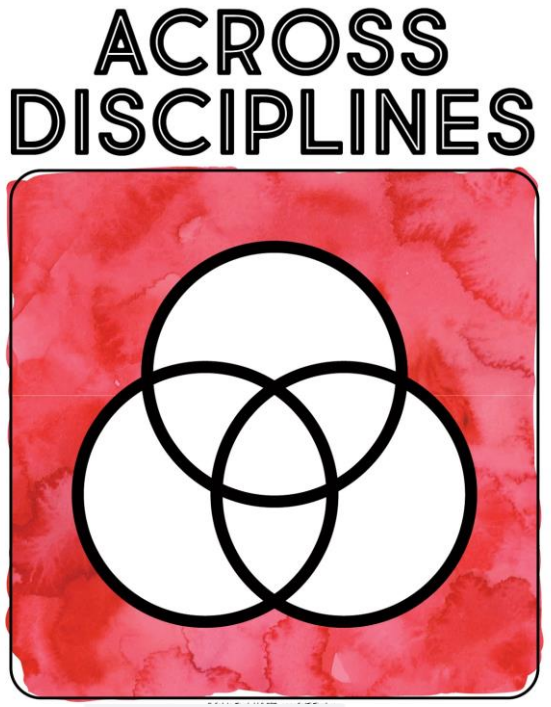


APPROACH

- **Cross disciplinary** approach
  - physicists
  - chemists
  - biologists
  - engineers
  - pharmacologists
  - odontologists
  - biotechnologists

- Goal
  - design
  - build, synthesize
  - characterize
  - test and use

…. new materials, tools and devices for nanotechnology



OBJECTIVES

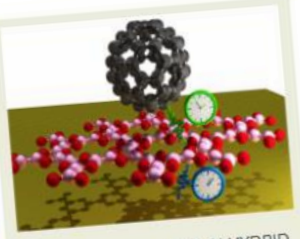
- The main objective of the school is to prepare researchers capable of designing, building and characterizing nanomaterials and nanostructured materials (NSM), tools and devices that meet the growing applicative needs, to make the industrial production more effective, affordable and sustainable and to meet the growing needs of our society, promoting its progress.
- The school is meant for graduates in physics, chemistry, engineering, biology, biotechnology, medicine, dentistry, pharmacy and pharmaceutical technology who aim at acquiring a high level of interdisciplinary preparation through specific courses and seminars covering also fields different from their own specific areas and carry out research projects in the framework of the collaborations with (inter)national research institutions and industries established by teachers and tutors of the school.

OBJECTIVES

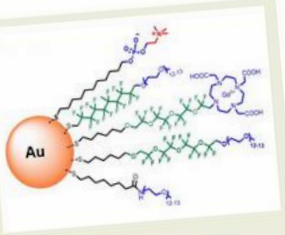
The **MAIN OBJECTIVES** of the research activities can be summarized as follows:

- Synthesis and engineering of nanomaterials and nanostructured materials (NSM)
- Development of new techniques for the study, manipulation and visualization of nanomaterials and NSM at the nanoscale
- Study of the relation between structure and properties of materials
- Multiscale molecular modeling of nanomaterials and NSM and phenomena of interest with computational simulation techniques
- Development of sensors for the detection of bio-molecules or compounds at a very low concentrations
- Application of nanotechnology, nanomaterials and NSM for research in the energy sector
- Application of nanotechnology in the biological, pharmaceutical, and medical sectors

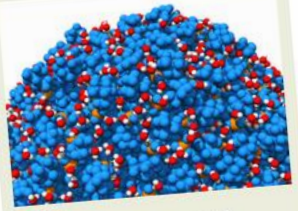
A MULTIDISCIPLINARY ENVIRONMENT



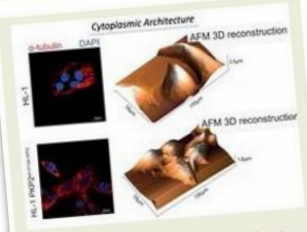
ELECTRON DYNAMICS IN HYDRID ORGANIC MATERIALS



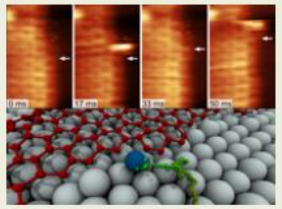
NANOCHEMISTRY LAB



SUPRAMOLECULAR NANOMATERIALS COMPUTATIONAL LAB (SMALL LAB)

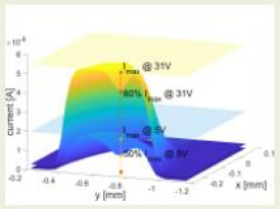


CELLULAR ENGINEERING AND MICROSYSTEMS LABORATORY (CEMSLAB)

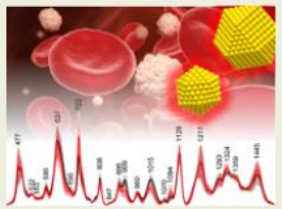


SURFACE STRUCTURE AND REACTIVITY AT THE ATOMIC SCALE (STRAS)

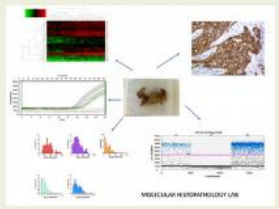
SURFACES, 2D-MATERIALS AND NANOCLUSTERS



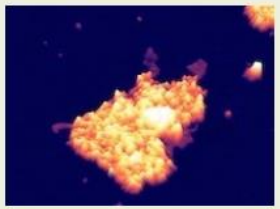
HIGH MOBILITY MOLECULAR BEAM EPITAXY LABORATORY @IOM-CNR



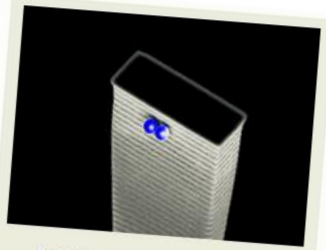
PLASMONIC SUBSTRATES FOR SERS SPECTROSCOPY: FROM STUDYING THE NANO-BIO INTERFACE TO CLINICAL APPLICATIONS



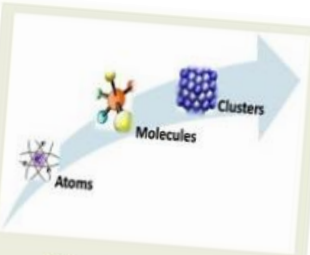
MOLECULAR HISTOPATHOLOGY LAB



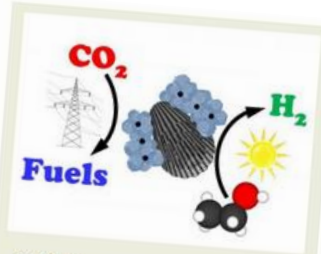
NANOINNOVATION LAB @Elettra



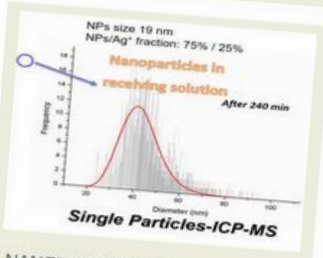
MICRO(NANO)FABRICATION, MICRO(NANO)SENSORS AND MECHANOBIOLOGY IN TRIESTE (MIT)



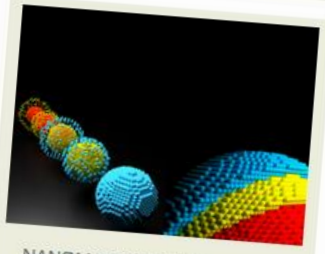
LOW DENSITY MATTER SPECTROSCOPY AND DYNAMICS



MATERIALS, ENVIRONMENT AND ENERGY (MEE)



NANOTOXICOLOGY FOR WORKERS AND CONSUMERS' PREVENTION



NANOMATERIALS FOR ENERGY APPLICATIONS (NAME LAB)

SUPERSTRUCTURES LAB

RESEARCH INSTITUTIONS

UniTS departments involved:

- Physics
- Chemistry and Pharmaceutical Sciences
- Engineering and Architecture
- Life Sciences
- Medicine, Surgery and Health Sciences

Elettra Sincrotrone Trieste

iom Istituto Officina dei Materiali

CIC biomaGUNE
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

AREA SCIENCE PARK

ICGEB International Centre for Genetic Engineering and Biotechnology

CERIC
Central European Research Infrastructure Consortium

CRO AVIANO

UMONS Université de Mons

FIS Fabbrica Italiana Sintetici

A.P.E. Research NANOTECHNOLOGY

ALI FAX
INSIDE INNOVATION

OUR WEBSITE

https://web.units.it/dottorato/nanotecnologie/

Here you will find:

- News and events
- Info about the training activity organized by the school
- Info about your duties

- A student guide
- The presentations of today

👉 HOW TO APPLY AND RULES section

https://web.units.it/dottorato/nanotecnologie/en/node/1894

PhD STUDENTS ACTIVITY

- Main focus is on research
  - High level research products are expected
- Training activity is required (see next)
- Internationalization is central
  - All activities are in English (thesis, reports, ..)
  - Lectures and seminars are in English
  - Thesis could be co-tutored
  - Possibility to obtain the **Doctor Europaeus** degree (minimum 3 months in a foreign European University)or
  - **PCAM degree** – International network of PhD programs in Physics and Chemistry of Advanced Materials

INTERNATIONAL NETWORK

PCAM
Physics and Chemistry
of Advanced Materials
EUROPEAN DOCTORATE

International network of PhD in "Physics and Chemistry of Advanced Materials"
http://www.pcam-doctorate.eu/

TU Graz
Graz University of Technology

uni.lu
UNIVERSITÉ DU LUXEMBOURG

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

UAM
UNIVERSIDAD AUTONOMA DE MADRID

TECHNISCHE UNIVERSITÄT DRESDEN

UNIVERSITÀ DEGLI STUDI DI MILANO

ktu
kaunas university of technology
1922

JAGIELLONIAN UNIVERSITY IN KRAKÓW

CARL VON OSSIETZKY universität OLDENBURG

UNIVERSITY OF SOUTHERN DENMARK

SORBONNE UNIVERSITÉ
CRÉATEURS DE FUTURS
DEPUIS 1257

Universidad del País Vasco
Euskal Herriko Unibertsitatea

FRIEDRICH-SCHILLER-UNIVERSITÄT JENA

Lomonosov Moscow State University

TRAINING ACTIVITY

PhD students have to attend training activities, which are complementary to their research, for at least 20 ECTS (1 ECTS = 8 hours of conventional teaching)

The recognition of ECTS is done by the Board of Professors, which has the duty to supervise and evaluate, at the end of every academic year, all of the activities of training and research carried out by every PhD student in order to admit them to the following academic year or to the thesis evaluation.

PhD students are encouraged to follow the disciplinary activities within the second year.

Activity	Hours/Credits	Limits	
Disciplinary activity	1 ECTS = 8 hours	at least 8 ECTS (maximum 10 ECTS) **of which at least 5 ECTS from the courses offered by the PhD program in Nanotechnology**	
Soft skills lessons offered by the University of Trieste	1 ECTS = 8 hours	at least 4 ECTS (one of which must be a credit from public engagement activity) (maximum 8 ECTS)	
Master's degree courses (of the University of Trieste or other universities)	Respecting ECTS	(maximum 4 ECTS)	
National and international schools	1 ECTS = 2 days	maximum 5 ECTS	
Conferences and workshops	1 ECTS = 2 days	at least 1 ECTS maximum 6 ECTS	
Complementary activities (assistance in laboratory activities) Complementary ECTS-non-recognized activities (tutoring)	ECTS provided by the course 1 ECTS = 25 hours	Maximum 12 ECTS	
Public engagement activities (Third Mission)	1 ECTS = 2 days	maximum 2 ECTS	

Mandatory activity Not mandatory activity

TRAINING ACTIVITY

The **full list of courses** organized for the PhD students in Nanotechnology for the AY 2023-2024 is available at the Training Activity page of the website. Sign the form to enroll. Details of the lessons (exact dates, etc ...) will be provided by each lecturer at due time.

👉 web.units.it/dottorato/nanotecnologie/en/node/1829

The training activity has to be agreed with prof. T. Da Ros and prof. A. Bonifacio. Read the Student Guide for details on documents to be prepared.

TRAINING ACTIVITY

- OTHER ACTIVITIES
  - Period abroad (max 12 months in three years) or in other italian research institutions

FIRST YEAR: RESEARCH&EDUCATION PLAN

- **Student NAME SURNAME**
  - Laboratory:
  - Title of the thesis:
  - SSD:
  - Supervisors:
- **Research activity foreseen**
  - State of the art and motivations
  - Objectives for the three years
  - Objectives for the first year
  - Research project
    - Write a description of the research program divided into activities and tasks, describing also the tools to be used. Include also a project Gantt diagram.
- **Training activity foreseen**
  - Plan of the training activity (disciplinary) to be carried out during the first and second year

EVERY YEAR: RESEARCH&EDUCATION REPORT

- **Student NAME SURNAME**
  - Laboratory:
  - Title of the thesis:
  - SSD:
  - Supervisors:
- **Research Activity**
  - Summary of the activity done
  - Objectives for the following year (if applicable)
  - Publications
- **Training Activity**
  - Periods abroad (date and place)
  - Classes followed (date, course, professor, type of course)
  - Conferences, seminars, advanced courses and other activities
  - Complementary training and teaching activity

DUE BY THE END OF AUGUST

EVERY YEAR

- Presentation (15 mins) in front of the teachers' board commission
  - Admission to the next year
  - Admission to the final exam (only at the third year)

  WHEN: first/second week of September
- One full presentation (15-20 mins) during the annual conference of the school

ACTIVITIES

Jožef Stefan Institute

University of Ljubljana

We proudly announce the winners of the "Crossborder workshop in nanoscience and nanotechnology" 2022 (CROSSNANO 2022) awards:

- **FERNANDO TOMMASINI AWARD** ("The most comprehensible talk") - Valeria Chesnyak (University of Trieste and CNR-IOM, Trieste) and Giulia Della Pelle (Jožef Stefan Institute, Ljubljana)
- **BEST CAREER AWARD** - Arianna Gazzi (University of Trieste and University of Padua)
- **ALESSANDRO DE VITA AWARD** ("The most multidisciplinary research and science-curious student") - Veronika Kost (University of Trieste) and Spase Stojanov (Jožef Stefan Institute, Ljubljana).

CROSSNANO
CROSSBORDER WORKSHOP IN NANOSCIENCE AND NANOTECHNOLOGY

WHEN
22-24 February 2022
9:00 – 18:00

WHERE
Room 3B, Building H3
University of Trieste
and
on line
via Microsoft Teams

PhD School in Nanotechnology

UNIVERSITY OF TRIESTE

ORGANIZERS

University of Trieste

Jožef Stefan International Postgraduate School

Jožef Stefan Institute

University of Ljubljana

STUDENTS REPRESENTATIVES

- **Andrea Berti**, e-mail: andrea.berti@phd.units.it

- **Lorenzo D'Amico**, e-mail: lorenzo.d'amico@phd.units.it

Term expiring, new representative to be elected

ADDITIONAL INFO

- Software (Origin licence)

  this is the link where you can download the software and where you will find the indications of the server where the license is available and that you will have to insert to start the program. The link is reachable from the university network or using the university VPN.

  !! Ask prof. Paola Posocco (paola.posocco@dia.units.it) if you are interested in having the link.

NEXT ACTIVITIES

- **Research&education plan**
  deadline 31/01/2024
  To be sent to prof. A. Morgante, prof. P. Posocco, prof. T. Da Ros, prof. A. Bonifacio for approval. Use the template provided here

- **Enrollment at the training activity** of the PhD program
  deadline 28/02/2024

- **Annual meeting** of the PhD program in Nanotechnology
  Usually at the end of February
  Use the template here for preparing your presentation


Enjoy
the
journey