



SCUOLA
NORMALE
SUPERIORE

RELAZIONE ATTIVITA' ANNUALE DEI PERFEZIONANDI/DOTTORANDI – PRIMO ANNO
REPORT ON THE PHD ACTIVITY – FIRST YEAR

NOME E COGNOME	Agata Zamborlin
NAME AND SURNAME	
DISCIPLINA/PHD COURSE	Nanoscienze

CORSI FREQUENTATI CON SOSTENIMENTO DI ESAME FINALE ATTENDED COURSES (WITH FINAL EXAM)	VOTAZIONE RIPORTATA MARK	NUMERO DI ORE HOURS
Introductory Quantum Physics	28	40
Physics of the Living Cell	28	45
Fundamentals of Biophysics at the Nanoscale	30	60

CORSI FREQUENTATI SENZA SOSTENIMENTO DI ESAME FINALE ATTENDED COURSES (ATTENDANCE ONLY)	NUMERO DI ORE HOURS
Lettorato di lingua inglese 4° livello (listening/speaking)	20
Ciclo di seminari- Biophysical sciences	45

ALTRE ATTIVITÀ FORMATIVE (SEMINARI, WORKSHOP, SCUOLE ESTIVE, ECC.) – DESCRIZIONE OTHER PHD ORIENTED ACTIVITIES (SEMINARS, WORKSHOPS, SUMMER SCHOOLS, ETC) – DESCRIPTION	NUMERO DI ORE HOURS
PhD school "Scientific Data Analysis School 2019" 25-28 novembre 2019	27

ATTIVITÀ DI RICERCA EVENTUALMENTE SVOLTA (MAX. 3.000 CARATTERI)



SCUOLA
NORMALE
SUPERIORE

RESEARCH ACTIVITY (MAX. 3000 CHARACTERS)

My research is focused on nanomedicine, and in particular on the development of nanosystems for theranostics. In my group, passion fruit-like nanoarchitectures (NAs) were developed for this application: they are formed by an array of ultra-small metal (as gold) nanoparticles in a poly(sodium 4-styrenesulfonate) and poly(L-lysine) matrix, then surrounded by a silica shell that gives a final diameter of 100 nm. This ultra-small-in-nano approach allows gold to be excreted by kidneys after intravenous administration in mice without accumulation nor damages to the liver.

Looking at future NAs application to pulmonary diseases, I evaluated the biodistribution of NAs after inhalation in mice using analytical techniques. Gold proved to accumulate in the lungs and translocate to secondary organs, including the brain, and to be almost completely excreted within ten days mainly through feces (Nanoscale Adv., 2020,2, 3815-3820).

For what concerns the therapeutic applications of NAs, they have already been modified with cis-platin by covalently binding it to poly-lysine: for the first time, I am optimizing the synthesis and characterization of nanostructures containing an organic drug, namely Gemcitabine, which has already been approved for the treatment of several types of cancer.

The aim is to add another drug molecule to the system, which may result in a combined therapy with cis-Platin or with hyperthermia, thus leading to an improved activity towards cancer cells, along with a better patient's compliance.

EVENTUALI PUBBLICAZIONI
PUBLICATIONS (IF AVAILABLE)



SCUOLA
NORMALE
SUPERIORE

Mapanao A. K., Giannone G., Summa M., Ermini M. L., **Zamborlin A.**, Santi M., Cassano D., Bertorelli R. and Voliani V., Biokinetics and clearance of inhaled gold ultrasmall-in-nano architectures. *Nanoscale Adv.*, 2020,**2**, 3815-3820

DATA	17/10/2020	FIRMA	
DATE		SIGNATURE	