

PhD

OPEN POSITIONS

Initial Call

**PhD topic 1: Ultrafast optical spectroscopy of primary photoinduced processes in DNA systems**

The PhD student will be recruited by the Department of Physics, Politecnico di Milano (Italy) to perform experimental work on time-resolved spectroscopy of DNA systems. The student will develop ultrafast spectroscopy setups in the UV with unprecedented sub-20-fs time resolution: transient absorption and two-dimensional ultraviolet (2DUV) spectroscopy. These systems will then be used for studies of the primary photoinduced processes in nucleic acids of growing complexity, from isolated nucleobases, nucleosides and nucleotides to stacked/paired dimers, single and double strand models and G-quadruplexes. Experimental results will be compared with advanced numerical simulations performed by UNIBO.

The ideal candidate should have a background in optics and photonics and preferentially an expertise in spectroscopic techniques and a basic knowledge of physical chemistry and photochemistry.

The recruitment will be based on the CV and motivation letter (recommendation letters are also welcome), followed by an interview for the short listed candidates.

**Additional Requirements:** M.Sc. (or equivalent graduation) in relevant area (e.g. Engineering, Physics or Physical Chemistry). Previous experience in optical spectroscopy techniques is preferred. Proof of English proficiency as communication and teaching language throughout LightDyNAmics is English.

**Contract start date (planned):** 01. November 2018

**Application deadline:** 01. May 2018

**Contact**

Prof. Giulio Cerullo  
Department of Physics  
Politecnico Milano  
[giulio.cerullo@polimi.it](mailto:giulio.cerullo@polimi.it)



**Group**

<https://www.fisi.polimi.it/en/people/cerullo>

**PhD topic 2: Modelling the two-dimensional ultraviolet spectroscopy of structural and photoinduced processes in DNA systems and their aggregates**

The PhD student will be recruited by the Department of Industrial Chemistry "Toso Montanari", Bologna University (Italy), to participate a research focused on the development, and application, of a multiscale computational approach (combining quantum mechanical (QM) with molecular mechanical (MM) calculations to run on-the-fly non-adiabatic semi-classical dynamics of photoinduced processes, including deactivation events) to model the 2DUV spectroscopy of photoexcited DNA. The aim is to reproduce and interpret the transient experimental signals recorded by POLIMI, in order to associate the observed spectroscopic signatures with their underlying electronic states and photoinduced dynamics, thus extracting the mechanistic information behind the recorded spectroscopy and assisting experiments interpretation. Eventually, these modelling techniques will be developed for tracking structural


**Contact**

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**Group**

Our group  
<https://www.unibo.it/sitoweb/marco.garavelli/en>

<p>heterogeneity and photo-induced events in DNA systems and their aggregates.</p> <p>The ideal candidate will have a background in computational (photo)chemistry. Experience with multiconfigurational and multireference perturbative methods is welcome, as well as some experience with excited state QM and QM/MM modelling.</p> <p>The recruitment will be based on the CV and motivation letter (recommendation letters are also welcome), followed by an interview for the short listed candidates.</p> <p><b>Additional Requirements:</b> M.Sc. (or equivalent graduation) in Chemistry or Physics. Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.</p> <p><b>Start date (planned):</b> 01. November 2018  <b>Application deadline:</b> 01. May 2018</p>	
<p><b>PhD topic 3: Quantum dynamics (QD) in nucleobases and small oligomers toward the simulation of time resolved spectra</b></p> <p>The PhD student will be recruited by the University of Pisa and work at CNR-ICCOM in Pisa to participate a research focused on the application of quantum-dynamical techniques to study internal conversion processes in DNA nucleobases and small oligomers and the development of new mixed quantum-classical dynamical approaches, to account for the effect of the solvent and/or the environment. On these grounds we aim at an explicit simulation and interpretation of the outcome of pump-probe and 2D electronic spectra.</p> <p><b>Additional Requirements:</b> Additional Requirements: M.Sc. (or equivalent graduation) in relevant area (e.g. Chemistry, Physics). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English. The ideal candidate will have a background in the theoretical study of photoinduced processes. Alternatively previous experience in Theoretical and Computational Chemistry is preferred. Programming skills (Fortran, etc) are welcome. The candidate must not have resided in the Italy for more than 12 months during the past 3 years. Application: send CV, motivation letter and 2 recommendation letters.</p> <p><b>Start date (planned):</b> 01. November 2018  <b>Application deadline:</b> 15. May 2018</p>	<p style="text-align: center;"><b>Contact</b>  Dr. Fabrizio Santoro  Institute of Chemistry of Organometallic  Compounds  Consiglio Nazionale delle Ricerche  <a href="mailto:fabrizio.santoro@pi.iccom.cnr.it">fabrizio.santoro@pi.iccom.cnr.it</a></p> <p style="text-align: center;"></p> <p style="text-align: center;"><b>Group</b>  <a href="http://www.pi.iccom.cnr.it/ThC2-Lab">http://www.pi.iccom.cnr.it/ThC2-Lab</a></p>

**PhD topic 4: Exciton and charge separation: computational models**

The main aims of the research project are: 1. Develop effective mixed quantum/classical computational strategies for the simulation of electronic spectra and the dynamics of excitation energy (EET) and charge transfers (CT) in strongly coupled multichromophore systems .2. Applying these methods to investigate the excited state dynamics of DNA, with special reference to G- quadruplexes The candidate will work under the supervision of Dr. Roberto Improta and with the co-supervision of Dr. F. Santoro (ICCOM-CNR) and of Dr. D. Markovitsi (LIDYL/CNRS), the research activity will be performed in collaboration with their laboratories.

The candidate will attend the doctoral School in Biomolecular Science at the University of Campania 'Luigi Vanvitelli'

**Additional Requirements:** M.Sc. (or equivalent graduation) in relevant area (e.g. Chemistry, Physics, Material Science). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English. The ideal candidate will have a background in the theoretical study of photoinduced processes. Alternatively previous experience in Theoretical and Computational Chemistry is preferred. Programming skills (Fortran, etc) are welcome.

The candidate must not have resided in the Italy for more than 12 months during the past 3 years. Application: send CV, motivation letter and 2 recommendation letters.

**Start date (planned):** 01. October 2018

**Application deadline:** 15. May 2018

**Contact**

Dr. Roberto Improta  
Institute for Biostructures and Bioimaging  
Consiglio Nazionale delle Ricerche  
[robimp@unina.it](mailto:robimp@unina.it)



**Group**

<https://sites.google.com/site/rimprotaibbcnr/>

**PhD topic 5: Refinement of Force Field for nucleic Acids**

An Early Stage Researcher position is available in Jiří Šponer lab (CEITEC, Masaryk University, Brno, Czech Republic) to participate in research focused on Multiscale theoretical and computational studies (using explicit-solvent atomistic molecular dynamics simulation methods and quantum chemistry) of DNA and RNA molecules, and their molecular interactions with proteins and ligands, with a specific emphasis given to non-canonical molecules such as guanine quadruplexes or folded RNA molecules. The research can be focused on applications as well as method development, in the latter case with emphasis given to development and testing of the simulation force fields.

**Additional Requirements:** M.Sc. (or equivalent graduation) in relevant area (e.g. Biology, Chemistry). Prior experience in computational studies of nucleic acids (preferable) or proteins, including a relevant research publication in the field. Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.

**Start date (planned):** 01. September 2018

**Application deadline:** 15. March 2018

**Contact**

Prof. Jiří Šponer  
Department of Structure and Dynamics of  
Nucleic Acids (CEITEC)  
Masaryk University  
[sponer@ncbr.muni.cz](mailto:sponer@ncbr.muni.cz)



**Group**

<http://www.ibp.cz/en/departments/structure-and-dynamics-of-nucleic-acids/info-about-the-department/>

**PhD topic 6: Interactions of chromophores with G-quadruplexes**

Chromophores as non-covalent dyes readily associate with DNA. G-quadruplexes are especially suitable for targeting with planar (poly)aromatic chromophores due to the large exposed surface area of guanine bases. The ability to control stability of G-quadruplex structures and modulate their activity has great potential in medicine. A PhD student will be recruited to study interactions between multi-chromophore ligands covalently or non-covalently attached to G-quadruplexes. The candidate will tackle the following tasks: Optimization of chromophore positioning in G-rich oligonucleotides. Analysis of effects of photoreactive chromophores on G-quadruplex structures. High-resolution structural characterization of chromophore-DNA with NMR spectroscopy. Measurement of dynamics of (multi)chromophore-DNA on a ms timescale.

**Additional Requirements:** M.Sc. (or equivalent graduation) in relevant area (e.g. Chemistry, Biochemistry). Experience in biomolecular NMR spectroscopy. Excellent English proficiency as communication and teaching language throughout LightDyNAMics is English.

**Start date (planned):** 01. September 2018

**Application deadline:** 01. May 2018

**Contact**

Prof. Janez Plavec  
Slovenian NMR Centre  
National Institute of Chemistry  
[janez.plavec@ki.si](mailto:janez.plavec@ki.si)

**Group**

<http://www.slomnr.si/>

**PhD topic 7: UV-induced processes in guanine quadruplexes studied by time-resolved optical spectroscopy: from photon absorption to radical reactivity**

Guanine Quadruplexes (G4) are four-stranded structures formed by guanine rich DNA sequences. They have been correlated with the oxidative damage which perturbs biological functions. In addition, G4 structures are studied in respect to their applications in molecular electronics and nanotechnologies.

The objective of the thesis is to study the generation and the reactivity of guanine radicals (including electron holes, important in charge transport) induced by absorption low energy UV radiation by G4. The investigation will involve the use of several experimental and computational techniques:

- The electrons ejected by photo-ionization and the resulting base radicals will be studied by time-resolved absorption spectroscopy and time-resolved circular dichroism, from nanoseconds to milliseconds.
- The dynamics of the excited states, expected to play a role in the photo-ionization process, will be studied by fluorescence spectroscopy, from femtoseconds to nanoseconds.
- The observed optical spectra will be interpreted by means of quantum chemistry methods.
- The reaction products resulting from UV-induced radicals will be identified using analytical methods

Additional training (8 months total) will be provided ETN partners in Italy and Germany



**University.** The PhD diploma will be delivered by the Université Paris Saclay. The candidate will be registered at the Doctoral School: Chemical Sciences: Molecules,

**Contact**

Dr. Dimitra Markovitsi  
Lasers, Interactions and Dynamics  
Laboratory  
Centre National de la Recherche Scientifique  
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**Group DICO**

[http://iramis.cea.fr/LIDYL/en/Phoce/Vie\\_des\\_labos/Ast/ast\\_groupe.php?id\\_groupe=616](http://iramis.cea.fr/LIDYL/en/Phoce/Vie_des_labos/Ast/ast_groupe.php?id_groupe=616)

<p>Materials, Instrumentation and Biosystems.</p> <p><b>Additional Requirements:</b>  M.Sc. in Physical Chemistry, Laser Spectroscopy or Biophysics.  Top ranking in the University.  Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.  The candidate must not have resided in France for more than 12 months during the past 3 years.  Application: send CV, motivation letter and 2 recommendation letters.  <b>Start date (planned):</b> 01. October 2018  <b>Application deadline:</b> 15. May 2018</p>	
<p><b>PhD topic 8: Direct and photosensitized damage of non-canonical DNA structures</b>  As our understanding of the important role that sequences capable of forming non-canonical DNA structures increases there is a need to gain greater understanding of their photostability. The PhD student will be recruited to investigate the photo-stability of cytosine i-motif and guanine quadruplex DNA structures. This will involve the spectroscopic study in the absence and presence of photoactive small molecules using transient and steady state visible and infrared methods including polarised spectroscopy.</p> <p><b>Additional Requirements:</b> M.Sc. or Hons BSc in Chemistry. Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.  <b>Start date (planned):</b> 01. September 2018  <b>Application deadline:</b> 01. May 2018</p>	<p style="text-align: center;"><b>Contact</b>  Prof. Susan Quinn  School of Chemistry  University College Dublin  <a href="mailto:susan.quinn@ucd.ie">susan.quinn@ucd.ie</a></p> <p style="text-align: center;"></p> <p style="text-align: center;"><b>Group</b>  <a href="https://sites.google.com/site/sjquinn/group/">https://sites.google.com/site/sjquinn/group/</a></p>
<p><b>PhD topic 9: Low energy electron damage in DNA</b>  Low energy electrons cause single and double strand breaks in DNA, even though the electrons have insufficient energy to ionise any part of the complex. While it is known that this happens, the mechanism by which the back-bone dissociation occurs has only been theorised. The key objective of this project is to probe the primary processes of electron injection onto isolated nucleobases and nucleotides. The study will involve the use of time-resolved (femtosecond) photoelectron spectroscopy combined with mass-spectrometry, and computational chemistry. The PhD student will become proficient in these aspects of the project and will receive further training through secondments and the wider network.</p> <p><b>Additional Requirements:</b> M.Sc. (or equivalent graduation) in relevant area (e.g. Chemistry, Physics). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English. The candidate must not have resided in the UK for more than 12 months during the past 3 years. Application: send CV, motivation letter and 2 recommendation letters.</p> <p><b>Start date (planned):</b> 01. October 2018  <b>Application deadline:</b> 15. May 2018</p>	<p style="text-align: center;"><b>Contact</b>  Prof. Jan Verlet  Department of Chemistry  University of Durham  <a href="mailto:j.r.r.verlet@durham.ac.uk">j.r.r.verlet@durham.ac.uk</a></p> <p style="text-align: center;"></p> <p style="text-align: center;"><b>Group</b>  <a href="http://www.verlet.net">www.verlet.net</a></p>

<p><b>PhD topic 10: Simulation of Photo-controlled DNA Binding and Damage</b></p> <p>The PhD student will be recruited to carry out advanced quantum chemical and dynamical simulations on spiropyran derivatives embedded in DNA.</p> <p><b>Additional Requirements:</b> M.Sc. (or equivalent graduation) in relevant area (e.g. Biology, Chemistry). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.</p> <p><b>Start date (planned):</b> 01. September 2018</p> <p><b>Application deadline:</b> 01. May 2018</p>	<p><b>Contact</b>  Prof. Leticia González  Institute for Theoretical Chemistry  leticia.gonzalez@univie.ac.at</p>  <p><b>Group</b>  <a href="http://theochem.univie.ac.at/">http://theochem.univie.ac.at/</a></p>
<p><b>PhD topic 11: Analysis of light-induced lesion formation at epigenetic pyrimidine bases</b></p> <p>The PhD student will be recruited to design and synthesize epigenetically relevant nucleosides and nucleotides. Light induced lesion formation processes will be investigated. Strong skills in organic synthesis and the application of modern analytical methods including mass spectrometry will be acquired during the study. Due to the desire to evaluate the biological consequences of epigenetic bases and of light induced mutagenesis, the ability to work in a highly interdisciplinary team with biologists is essential.</p> <p><b>Additional Requirements:</b> M.Sc. (or equivalent graduation) in Chemistry). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.</p> <p><b>Start date (planned):</b> 01. June 2018</p> <p><b>Application deadline:</b> 02. April 2018</p>	<p><b>Contact</b>  Prof. Thomas Carell  Department of Chemistry  Ludwig-Maximilians-Universität München  <thomas.carell@lmu.de< th=""></thomas.carell@lmu.de<></p>  <p><b>Group</b>  <a href="http://www.carellgroup.de/">http://www.carellgroup.de/</a></p>
<p><b>PhD topic 12: Analysis of the mutagenicity and repair of light induced lesions</b></p> <p>The PhD student will be recruited to analyse the biological consequence of epigenetic bases in the genome and repair of light induced lesions. Strong knowledge in molecular biology, cell biology and modern mass spectrometry bases proteomics technologies will be acquired during the study. The candidate will be expected to adapt to an interdisciplinary working environment. A broad basis for understanding DNA based biochemistry is required. Knowledge in cell culture techniques and/or protein biochemistry is a plus.</p> <p><b>Additional Requirements:</b> M.Sc. (or equivalent graduation) in Biochemistry). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.</p> <p><b>Start date (planned):</b> 01. June 2018</p> <p><b>Application deadline:</b> 02. April 2018</p>	<p><b>Contact</b>  Prof. Thomas Carell  Department of Chemistry  Ludwig-Maximilians-Universität München  <thomas.carell@lmu.de< th=""></thomas.carell@lmu.de<></p> 



**PhD topic 13: New dyes for better click chemistry on DNA**

The PhD student will develop new fluorogenic compounds with internal copper chelating groups allowing for the reduction of harmful copper species during click reactions in biological systems plus enhancing reaction rates. Moreover, new dye conjugates will be identified, synthesised and tested in biological applications that show fluorogenic and / or photo induced sensitive properties only after the click reaction paving the way for in vivo use of click reactions.

**Additional Requirements:** M.Sc. (or equivalent graduation) in relevant area (preferably Organic Chemistry). Proof of English proficiency as communication and teaching language throughout LightDyNAMics is English.

**Start date (planned):** 01. September 2018

**Application deadline:** 15<sup>th</sup>. May 2018

**Contact**

Dr. Birgit Graf  
Baseclick GmbH  
b.graf@baseclick.eu



<https://baseclick.eu/>

**PhD topic 14: Analysis of G-quadruplexes and DNA-binding proteins on a chip**

**Job Purpose**

An Early Stage Researcher (ESR) will be recruited as a PhD candidate at Dynamic Biosensors for the analysis of G-quadruplexes and DNA-binding proteins on a chip. You will be part of an interdisciplinary R & D Team. A broad basis for understanding DNA based biochemistry is required. Knowledge in molecular interaction analysis methods is a plus.

**Application deadline:** 01 May 2018

**Start date (planned):** 01 September 2018

**Description**

Dynamic Biosensors is a young biotech company based in Munich, Germany, and San Diego, California, focused on the development and marketing of novel technology for biophysics in the areas of molecular interaction analysis and drug discovery. The company's pioneering and award-winning switchSENSE technology is used in life science research in academic and industry laboratories.

**Additional Requirements:**

- M.Sc. (or equivalent graduation) in relevant area (e.g. Biology, Chemistry, Biochemistry, Physical Chemistry, Molecular Biology, Biotechnology or similar).
- High interest in biophysical methods
- Fluency in relevant models, techniques or methods and ability to contribute to developing new ones
- Fluent in English (communication and teaching language throughout LightDyNAMics is English)
- Ability to communicate complex information clearly
- Ability to assess resource requirements and use resources effectively
- Understanding of and ability to contribute to broader management/administration processes
- Great team spirit, having fun collaborating

To apply please send following documents in one PDF-file to [careers@dynamic-biosensors.com](mailto:careers@dynamic-biosensors.com)

**Contact**

Dr. Ralf Strasser  
Dynamic Biosensors GmbH  
strasser@dynamic-biosensors.com



<https://www.dynamic-biosensors.com/>

1. Personal statement (up to 1 page) about the applicants' experience, interests and career goals.
2. CV with a list of publications and/or projects.
3. Evidence of having obtained a degree that qualifies the applicant for PhD enrolment (such as scan of the master certificate).
4. Official transcript of grades obtained during the applicants Bachelor and Master studies.
5. Names and contact information of at least two academic referees who could write a letter of recommendation.

Please note that only complete application sets will be considered.

**Start date (planned):** 01. September 2018

**Application deadline:** 01. May 2018

**PhD topic 15: Characterization and modulation of DNA-Protein binding interactions**

Genome editing has the potential to be transformative in delivering future therapeutics. Increased mechanistic understanding of CRISPR-Cas systems on a molecular level will be key to future developments of genome editing.

The Ph.D. student will characterize the molecular mechanisms, interactions and enzymology underlying gene-editing systems such as CRISPR/Cas or Base editors and will have the opportunity to utilize a range of experimental technologies including Biochemical/Biophysical and cell biology techniques.

The Ph.D. student will work at the interface of both the Mechanistic Biology and the Precise Genome Editing teams at AstraZeneca, based in Cambridge UK. This is an exciting opportunity to gather insights into the mechanism of action of the most advanced genome editing systems.

The student will be enrolled at the University of Durham and will have the opportunity to work within our global AstraZeneca PhD and post-doctoral student community.

This opportunity enables collaboration within the LightDynamics academic network and existing AstraZeneca external collaborators. We'll expect you to maintain an awareness of current developments in the literature and identify and pursue opportunities within this Scientific field. You'll achieve personal scientific visibility through scientific experimentation, internal and external presentations and authorship in peer-reviewed publications

At AstraZeneca, we believe in the potential of people who share our passion for science. By thinking boldly and working collaboratively to pursue discoveries beyond imagination, you'll develop further and faster than you thought possible. AstraZeneca is an equal opportunity employer. AstraZeneca will consider all qualified applicants for employment without discrimination on grounds of disability, sex or sexual orientation, pregnancy or maternity leave status, race or national or ethnic origin, age, religion or belief, gender identity or re-assignment, marital or civil partnership status, protected veteran status (if applicable) or any other

**Contact**

Dr. Karla Herlihy  
Reagents & Assay Development  
AstraZeneca Limited

[https://astrazeneca.wd3.myworkdayjobs.com/Careers/job/UK---Cambridge/PhD--Mechanistic-Characterization-of-Genome-Editing-Nucleases\\_R-029051-1](https://astrazeneca.wd3.myworkdayjobs.com/Careers/job/UK---Cambridge/PhD--Mechanistic-Characterization-of-Genome-Editing-Nucleases_R-029051-1)





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**Additional Requirements:** M.Sc. or Hons BSc in Biochemistry, Chemistry or Molecular Biology. Proof of English proficiency as communication and teaching language throughout LightDyNAmics is English.

**Start date (planned):** 01. September 2018

**Application deadline:** 01. June 2018

Applicants for the PhD positions must not yet been awarded a PhD degree and must be in the first 4 years (full-time equivalent) of their research careers prior to the recruitment.

All applicants must not have resided or carried out their main activity (work, studies, etc.) in the country of the organization they are applying to for more than 12 months in the 3 years immediately prior to the recruitment.

Positions include interdisciplinary training, summer schools and yearly international meetings.

Please send a CV and cover letter (pdf format) by email to the appropriate organisation (see individual project application deadlines).