

Alessandro Porchetta

Tenure Track Assistant Professor

University of Rome, Tor Vergata

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CURRICULUM VITAE

Date of Birth 06/10/1984

Sex Male

Nationality Italian

EDUCATION

Ph.D. – Chemical Sciences

Period: Nov 2010 - Jan 2014

Institute: Chemistry Department, University of Rome Tor Vergata, Italy

Thesis title: "Strategies to tune, narrow and extend the dynamic range of DNA-based switches"

Supervisor: Prof. F. Ricci

Final mark: Excellent

Master degree – Chemistry (Physical Chemistry)

Period: Mar 2008 - May 2010

Institute: Chemistry Department, University of Rome Tor Vergata, Italy

Thesis title: "Photo-induced Electron Transfer Reactions in Conformationally Strict Peptides "

Supervisor: Prof. M. Venanzi

Final score: 110/110 cum laude

RESEARCH EXPERIENCE

Apr 2019 -

Tenure Track Assistant Professor

Chemistry Department, University of Rome, Tor Vergata, Italy

Apr 2016 – April 2019

Senior Researcher

Chemistry Department, University of Rome, Tor Vergata, Italy

Feb 2014 - Mar 2016

Post-doctoral Researcher

Chemistry Department, University of Rome, Tor Vergata, Italy

Laboratory of Prof. **Giuseppe Palleschi**

Dic 2014 - Feb 2015

Visiting Post-doctoral Researcher

Marie Curie Fellow (Int. Research Staff Exchange Scheme, IRSES).

Shanghai Institute of Applied Physics, China

Laboratory of Prof. C. Fan

Nov 2010 - Feb 2014

PhD student

Chemistry Department, University of Rome, Tor Vergata, Italy

Laboratory of Prof. **Francesco Ricci**

Sep 2011 – Jan 2012

Visiting PhD student

Marie Curie Fellow (International Research Staff Exchange Scheme, IRSES)

Chemistry and Biochemistry Department, University of California, Santa Barbara

Prof. Kevin W. Plaxco (<https://labs.chem.ucsb.edu/plaxco/kevin/>)

CURRENT RESEARCH INTERESTES

Structure-switching biomolecules, Functional DNA Nanotechnology, Nucleic Acid-based sensors, DNA-based bioresponsive materials.

AWARDS

- June 2018** **"The European Young Chemist Awards (EYCA)"** recognized at the EuChemES Conference 2018 (sponsored by SCI, 1600 €).
- May 2014** **"Primo Levi Award"** by the Italian Chemical Society for the best publication of 2014 (Young Chemistry Researchers Award, \$ 500).
- May 2013** **"Primo Levi Award"** by the Italian Chemical Society - special mention by the Italian Chemical Society.

VISITING PERIODS

- June 2018 - Aug 2018 **Visiting Researcher (Principal Investigator)**. Marie Curie Fellow (RISE project "NanoOligoMed"). University of California, San Diego (UCSD). Laboratory of Prof. M. Sailor.
- Dic 2014 - Feb 2015 **Visiting Post-doctoral Researcher**. Marie Curie Fellow (Int. Res. Staff Exc. Scheme, IRSES). Shanghai Institute of Applied Physics, China. Laboratory of Prof. C. Fan.
- Sep 2011 – Jan 2012 **Visiting PhD student**. Marie Curie Fellow (Int. Res. Staff Exc. Scheme, IRSES), Chemistry and Biochemistry Department, University of California, Santa Barbara. Prof. Kevin W. Plaxco

RESEARCH GRANT

Year	Budget	Role	Funding Body/Title
2017	135kEuro	P.I.	Horizon-2020 RISE grant – Marie Skłodowska-Curie "Nano-OligoMed". Start date: January 2018.
2018	21 kEuro	P.I.	University of Tor Vergata grant – "MIRA". Start date March 2018

TEACHING/SUPERVISION ACTIVITY

- Jan 2017 – current Fundamentals of Analytical Chemistry. Bachelor degree in Chemistry, University of Rome, Tor Vergata (average enrolment: 75 students). 6 CFU
- Jan 2012– Jun 2016 Laboratory instructor "*Analytical Chemistry*", master degree, Chemistry department, University of Rome Tor Vergata (average enrolment: 50 students)

PUBLICATIONS

28 papers (+1 just accepted) in ISI peer-reviewed journals
8 papers as **first-author** 5 papers as **corresponding author** (2 as co-corresponding)
H-index: 14
> 600 total citations (Scopus 10th May 2019)
10 papers in journals with impact factor (IF) > 10 (5 *JACS* + 3 *Nano Letters* + 1 *Acc. Chem. Res.* + 1 *Ang. Chem. Int. Ed.*)

LIST OF PUBLICATIONS

27. Ranallo, S., **Porchetta, A.*** (co-corr. author) Ricci, F., 2018. DNA-based scaffolds for sensing applications. *Anal. Chem.*, 91(1), 44-59.
26. Nascetti, A., Mirasoli, M., Marchegiani, E., Zangheri, M., Costantini, F., **Porchetta, A.**, Iannascoli, L., Lovecchio, N., Caputo, D., de Cesare, G. and Pirrotta, S., (2019) Integrated chemiluminescence-based lab-on-chip for detection of life markers in extraterrestrial environments. *Biosens. Bioelectron.*, 123, 195-203.
25. Mazzaracchio, V., Neagu, D., **Porchetta, A.**, Marcoccio, E., Pomponi, A., Faggioni, G., D'Amore, N., Notargiacomo, A., Pea, M., Moscone, D. and Palleschi, G. (2019) A label-free impedimetric aptasensor for the detection of *Bacillus*

anthracis spore simulant.

Biosens. Bioelectron., 126, 640-646.

24. Petropoulos, K., Bodini, S.F., Fabiani, L., Micheli, L., Porchetta, A., Piermarini, S., Volpe, G., Pasquazzi, F.M., Sanfilippo, L., Moscetta, P., Chiavarini, S. (2019) Re-modeling ELISA kits embedded in an automated system suitable for on-line detection of algal toxins in seawater.
Sens. Actuators B. Chem., 283, 865-872.
23. Patino, T., **Porchetta, A.*** (co-first author), Jannasch, A., Lladó, A., Stumpp, T., Schäffer, E., Ricci, F. and Sanchez, S. (2019) Self-sensing enzyme-powered micromotors equipped with pH responsive DNA nanoswitches.
Nano lett. doi:10.1021/acs.nanolett.8b04794 (*Featured in the Front Cover*)
22. Rossetti, M., Ranallo, S., Idili, A., Palleschi, G., **Porchetta, A.*** (co-corr. Author) Ricci, F. (2017). Allosteric DNA nanoswitches for controlled release of a molecular cargo triggered by biological inputs. **Chem. Sci.**, 8(2), 914-920.
21. Rossetti, M., Ippodrino, R., Marini, B., Palleschi, G., **Porchetta, A.*** (corr. author) (2018). Antibody-mediated small molecule detection using programmable DNA-switches.
Anal. Chem., 90(13), 8196-8201.
20. Bertucci, A.,* **Porchetta, A.*** (co-first author), Ricci, F. (2018). Antibody-templated assembly of an RNA mimic of the Green Fluorescent Protein
Anal. Chem., 90(2), 1049-1053.
19. **Porchetta, A.**, Ippodrino, R., Marini, B., Caruso, A., Caccuri F., Ricci F. (2018). Programmable nucleic acid nanoswitches for the rapid, single-step detection of antibodies in bodily fluids
J. Am. Chem. Soc., 140(3), 947-953.
18. Rossetti, M., **Porchetta, A.*** (corresponding author) (2017) Allosterically Regulated DNA-based Switches: from Design to Bioanalytical Applications – A review
Anal. Chim. Acta, 10.1016/j.aca.2017.12.046.
17. Ricci, F., Vallée-Bélisle, A., Simon, A., **Porchetta, A.**, Plaxco, K. (2016) Using Nature's "tricks" to rationally tune the binding properties of biomolecular receptors.
Acc. Chem. Res., 49,1884–1892.
16. **Porchetta A.**, Idili A., Vallée-Bélisle A., Ricci F. (2015) A general strategy to introduce pH-induced allostery in DNA-based receptors to achieve controlled release of ligands.
Nano Lett., 15, 4467–4471.
15. **Porchetta, A.**, Vallée-Bélisle, A., Plaxco, K.W., Ricci, F. (2012). Using distal site mutations and allosteric inhibition to tune, extend and narrow the useful dynamic range of aptamer-based sensors.
J. Am. Chem. Soc., 134 (51), 20601-20604. (*Featured in JACS Spotlight article and in many scientific news media (sciencedaily, biosciencetechnology, etc.)*).
14. **Porchetta, A.**, Vallée-Bélisle, A., Plaxco, K.W., Ricci, F. (2013). Allosterically Tunable, DNA-Based Switches Triggered by Heavy Metals.
J. Am. Chem Soc., 135 (36), 13238–13241.
13. Idili, A.,* **Porchetta, A.*** (co-first author), Amodio, A., Vallée-Bélisle, A., Ricci, F. (2015) Controlling hybridization chain reaction using pH.
Nano Lett., 15 (8), 5539–5544.
12. Amodio, A.*, Zhao, B.*, **Porchetta, A.*** (co-first author), Idili, A.; Castronovo, M.; Fan, C.; Ricci, F. (2014) Rational design of pH-controlled DNA strand displacement.
J. Am. Chem. Soc., 136 (47), 16469–16472.
11. Ricci, F., Vallée-Bélisle, A., **Porchetta, A.**, Plaxco, K.W. (2012) The rational design of allosteric inhibitors and activators using the population-shift model: in vitro validation and

application to an artificial biosensor

J. Am. Chem. Soc., 134, 15177-15180 .

10. Kang, D., Vallée-Bélisle, A., **Porchetta, A.**, Plaxco, K.W., Ricci, F. (2012)
Re-engineering electrochemical biosensors to narrow or extend their useful dynamic range.
Angew. Chem. Int. Ed., 51 (27), 6717-6721.
9. Rossetti, M., Ranallo, S., Idili, A., Palleschi, G., **Porchetta, A.*** (co-corresponding author), Ricci, F.* (2017)
Allosteric DNA nanoswitches for controlled release of a molecular cargo triggered by biological inputs
Chem. Science, 8, 914-920. (*Featured in the Front Cover of Chem. Sci.*)
8. Del Grosso, E., Idili, A., **Porchetta A.**, Ricci, F. (2016)
A modular clamp-like mechanism to regulate the activity of nucleic-acid target-responsive nanoswitches with external activators.
Nanoscale, 2016, 8, 18057-18061. (*Featured in the Front Cover of Nanoscale*)
7. Ranallo, S., Amodio, A., Idili, A., **Porchetta, A.**, Ricci, F. (2016)
Electronic control of DNA-based nanoswitches and nanodevices.
Chem. Sci., 7, 66-71. (*Featured in the Front Cover of Chem. Science*)
6. Adornetto, G., **Porchetta, A.**, Palleschi, G., Plaxco, K.W., Ricci, F. (2015)
A general approach to the design of allosteric, transcription-factor-regulated DNazymes.
Chem. Sci., 6, 3692-3696. (*Featured in the Front Cover of Chem. Science*)
5. Venanzi, M., Gatto, E., Caruso, M., **Porchetta, A.**, Formaggio, F., Toniolo, C. (2014)
Photoinduced Electron Transfer through Peptide-Based Self-Assembled Monolayers Chemisorbed on Gold Electrodes: Directing the Flow-in and Flow-out of Electrons through Peptide Helices.
J. Phys. Chem. A, 118 (33), 6674–6684.
4. Gatto, E., **Porchetta, A.**, Scarselli, M., De Crescenzi, M., Formaggio, F., Toniolo, C., Venanzi, M. (2012).
Playing with Peptides: How to Build a Supramolecular Peptide Nanostructure by Exploiting Helix-Helix Macrodipole Interactions.
Langmuir, 28 (5), 2817-2826.
3. Biagiotti, V., **Porchetta, A.**, Desiderati, S., Plaxco, K. W., Palleschi, G., Ricci, F. (2012).
Probe accessibility effects on the performance of electrochemical biosensors employing DNA monolayers.
Anal. and Bioanalytic. Chem., 402(1), 413-421.
2. Gatto, E., Caruso, M., Porchetta, A., Toniolo, C., Formaggio, F., Crisma, M., et al. (2011).
Photocurrent generation through peptide-based self-assembled monolayers on a gold surface: Antenna and junction effects.
Journ. of Pep. Science, 17(2), 124-131.
1. Gatto, E., Porchetta, A., Stella, L., Guryanov, I., Formaggio, F., Toniolo, C., Kaptein, B., Broxterman, Q.B., Venanzi, M. (2008).
Conformational effects on the electron transfer efficiency in peptide foldamers based on α,α -disubstituted glyceryl residues.
Chem. Biodiv., 5, 1263-1278.

ORAL PRESENTATIONS

14 oral contributions in international conference and workshop, **15 Poster contributions** in international conferences (not reported here).

Aug 2018	7th EUChemES , Liverpool, UK (Invited Speaker , European Young Chemists Award Competition Sessions)
Sep 2017	<i>Italian Chemistry Society General Conference</i> , Paestum, Italy
June 2017	<i>Future Trends in DNA-based Nanotechnology Conference</i> , Dresden, Germany
Oct 2016	Devotes Conference (Final Conference UE funded projects), Bruxelles, Belgium
Sep 2016	6th EUChEMS Chemistry Conference , Siviglia, Spain

Sep 2016 *Italian Chemistry Society General Conference*, Taormina, Italy (**Invited Speaker**)
May 2016 *ALBNANO-Nanotechnology and biosensors*, Tirana, Albany (**Invited Speaker**)
June 2016 **6th European Conference on Chemistry in Life Science**, Lisbon, Portugal
June 2016 2th Functional DNA Nanotechnology 2014, Rome, Italy
Sep 2016 *Italian Chemistry Society General Conference*, Arcavacata, Italy
Sep 2015 *Italian Analytical Chemistry Generale Conference*, Sestri Levante, Italy
May 2015 *Workshop 'Bioinspired-nanotechnology for Biosensing'*, Sitges, Spain
Dec 2015 *Workshop 'Ageing on mind 2012'*, Tel Aviv, Israel
Sep 2015 *Italian Analytical Chemistry Generale Conference*, Isola d'Elba, Italy

ORGANIZATION OF SCIENTIFIC MEETINGS

Jul 2016 Organization Committee: 2th Functional DNA Nanotechnology 2016, Rome, Italy
Jul 2014 Organization Committee: 1th Functional DNA Nanotechnology 2014, Rome, Italy

MEMBERSHIP OF SCIENTIFIC SOCIETIES

Jan 2012 - present Member of the Italian Chemical Society (SCI)