

Alessandro Porchetta

Tenure Track Assistant Professor
University of Rome, Tor Vergata
Via della Ricerca Scientifica, 1,
00133, Rome, Italy
Email: alessandro.porchetta@uniroma2.it

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 2022 -

Associate Professor

Chemistry Department, University of Rome, Tor Vergata, Italy

Apr 2019 – Apr 2022

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

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

CRISPR-Cas technology, DNA Nanotechnology, biomolecular sensors, DNA-based hybrid materials, Molecular switch

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

- Dic 2019 – Jan 2020 **Visiting Researcher (Principal Investigator)**. Marie Curie Fellow (RISE project "NanoOligoMed"). ICMAB, Barcelona (Spain). **Prof. Nora Ventosa**. (1 collaborative paper just submitted, in which I'm the **corresponding author**)
- Jun 2018 - Aug 2018 **Visiting Researcher (Principal Investigator)**. Marie Curie Fellow (RISE project "NanoOligoMed"). University of California, San Diego (UCSD). **Prof. Mike Sailor**.
- Jan 2018 – Feb 2018 **Visiting Researcher**. IBEC Institute (Barcelona). Prof. **Samuel Sanchez** (The visiting period was fundamental to strengthen collaboration which resulted in 1 **NanoLetter**, I'm **co-first author**)
- Dic 2014 - Feb 2015 **Visiting PhD student**. Marie Curie Fellow (Int. Res. Staff Exc. Scheme, IRSES). Shanghai Institute of Applied Physics, China. **Prof. Chunai Fan**. (1 **JACS** paper, **co-first author**)
- Sep 2011 – Feb 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**. (My first visiting period was very fruitful, we published **2 JACS** papers and I was the first author!)

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
2022	115 kEuro	P.I.	Horizon-2022 Staff Exchange – Marie Skłodowska-Curie "Nano-ImmunoEra". Start date: January 2023.
2022	500 kEuro	P.I.	My First Airc - REPAIR-NANO. Start date: January 2023

TEACHING/SUPERVISION ACTIVITY

- Sep 2019 - current Applied Analytical Chemistry. Master degree in Chemistry, University of Rome, Tor Vergata (average enrolment: 25 students). 6 CFU
- 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

39 papers (+2 under revision) in ISI peer-reviewed journals
9 papers as **first-author** **11** papers as **corresponding author**
H-index: 23 (Scholar)
1586 total citations (Scholar 24th April 2023)

19 papers in journals with impact factor (IF) > 10 (6 *JACS* + 3 *Nano Letters* + 1 *Acc. Chem. Res.* + 5 *Ang. Chem. Int. Ed.* + 1 *Adv. Funct. Mater.* etc.)

LIST OF PUBLICATIONS

- 38 Rossetti, M., Merlo, R., Bagheri, N., Moscone, D., Valenti, A., Saha, A., ... & **Porchetta, A.*** (corresponding author) (2022). Enhancement of CRISPR/Cas12a trans-cleavage activity using hairpin DNA reporters. *Nucleic Acids Res.*, 50(14), 8377-8391.
- 37 Fortunati, S., Vasini, I., Giannetto, M., Mattarozzi, M., **Porchetta, A.**, Bertucci, A. and Careri, M., (2022). Controlling dynamic DNA reactions at the surface of single-walled carbon nanotube electrodes to design hybridization platforms with a specific amperometric readout. *Anal. Chem.*, 94(12), 5075-5083.
- 36 Patino Diaz, A., Bracaglia, S., Ranallo, S., Patino, T., **Porchetta, A.** and Ricci, F. (2022). Programmable cell-free transcriptional switches for antibody detection. *J. Am. Chem. Soc.* 144(13), 5820-5826.
- 35 Zanut, A., Rossetti, M., Marcaccio, M., Ricci, F., Paolucci, F., **Porchetta, A.*** (co-corresponding author), & Valenti, G. (2021). DNA-Based Nanoswitches: Insights into Electrochemiluminescence Signal Enhancement. *Anal. Chem.*, 93(30), 10397-10402.
- 34 Rossetti, M., Stella, L., Morlà-Folch, J., Bobone, S., Boloix, A., Baranda, L., ... & **Porchetta, A.** (corresponding author) (2021). Engineering DNA-Grafted Quasomes as Stable Nucleic Acid-Responsive Fluorescent Nanovesicles. *Adv. Funct. Mater.*, 2103511.
- 33 Bertucci, A., Porchetta, A., Del Grosso, E., Patiño, T., Idili, A., & Ricci, F. (2020). Protein-Controlled Actuation of Dynamic Nucleic Acid Networks by Using Synthetic DNA Translators. *Angew. Chem. Int. Ed.*, 59(46), 20577-20581.
- 32 Rossetti, M., Bertucci, A., Patiño, T., Baranda Pellejero, L., & **Porchetta, A. (Corresponding Author)** (2020). Programming DNA-based systems through effective molarity enforced by biomolecular confinement. *Chem. Eur. J.*, 26, 9826-9834.
- 31 Rossetti, M., Del Grosso, E., Ranallo, S., Mariottini, D., Idili, A., Bertucci, A., & Porchetta, A. (2019). Programmable RNA-based systems for sensing and diagnostic applications. *Anal. Bioanal. Chem.*, 411(19), 4293-4302.
- 30 Arrabito, G., Cavaleri, F., **Porchetta, A.**, Ricci, F., Vetri, V., Leone, M., & Pignataro, B. (2019). Printing Life-Inspired Subcellular Scale Compartments with Autonomous Molecularly Crowded Confinement. *Adv. Biosystems*, 3(7), 1900023.
- 29 Mocenigo, M., **Porchetta, A. (Co-first author)**, Rossetti, M., Brass, E., Tonini, L., Puzzi, L., ... & Ippodrino, R. (2020). Rapid, Cost-Effective Peptide/Nucleic Acid-Based Platform for Therapeutic Antibody Monitoring in Clinical Samples. *ACS sensors*, 5(10), 3109-3115.
- 28 Rossetti, M., Brannetti, S., Mocenigo, m., Marini, B., Ippodrino, R., **Porchetta, A.*** (corr. author) (2020) Harnessing Effective Molarity to Design an Electrochemical DNA-based Platform for Clinically Relevant Antibody Detection *Ang. Chem. Int. Ed.* 132 (35), 15083-15088.
- 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 glycolyl residues.
Chem. Biodiv., 5, 1263-1278.

ORAL PRESENTATIONS

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

Nov 2022	<i>Invited Talk at CNR - Institute of Biosciences and Bioresources (Napoli)</i>
Oct 2022	<i>Invited Speaker (Biosensor School) Trends in Nanotechnology International Conference (TNT2022)</i>
Sep 2022	<i>XXIX Congresso della Divisione di Chimica Analitica della Società Chimica Italiana (SCI)</i>
Sep 2021	Key note - <i>XXVIII Congresso della Divisione di Chimica Analitica della Società Chimica Italiana (SCI)</i>
Aug 2018	7h EUChemES , Liverpool, UK (Invited Speaker , European Young Chemists Award Competition Sessions)
Sep 2017	<i>Italian Chemistry Society General Conference, Paestum, Italy</i>
June 2017	<i>Future Trends in DNA-based Nanotechnology Conference, Dresden, Germany</i>

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

ORGANIZATION OF SCIENTIFIC MEETINGS

Mar 2023	Organization Committee: Giornate di Bioanalitica 2023, Florence, Italy
Jul 2016	Organization Committee: 2 th Functional DNA Nanotechnology 2016, Rome, Italy
Jul 2014	Organization Committee: 1 th Functional DNA Nanotechnology 2014, Rome, Italy

MEMBERSHIP OF SCIENTIFIC SOCIETIES

Sep 2022 - present	Board member of the divisional group "Bioanalytical Chemistry" (SCI)
Jan 2012 - present	Member of the Italian Chemical Society (SCI)

Autorizzo il trattamento dei miei dati personali ai sensi degli articoli 13 e 14 del Regolamento UE 2016/279.
Roma li, 24/10/2020