

CURRICULUM VITAE



PERSONAL DETAILS

Name	Dr. Tobias Cramer
Address	Via di Campiano 9, 40127 Pianoro (BO), Italy
Phone numbers	+39 334 890 6215
Email	tobias.cramer@unibo.it
Nationality	German
Date of birth	28.9.1976, Osnabrück (D)

PROFESSIONAL EXPERIENCE

Since June 2020	Associate Professor, Department of Physics and Astronomy, Bologna, Italy. Group research activity in novel semiconductors for bioelectronics. Teaching activities in the "Materials Physics and Nanoscience" Master Course and in Physics Undergraduate Classes.
Mai 2017 – Mai 2020	Tenure-track Professor, Department of Physics and Astronomy, Bologna, Italy. Work in the semiconductor physics group. Focus on flexible and stretchable semiconductors for photonic applications and bioelectronics. Teaching of the course "Laboratory of Nanoscience and Technology" in the Master Degree "Materials Physics and Nanoscience (MANO)"
April 2014 - April 2017	Researcher, Department of Physics and Astronomy, University of Bologna, Italy. Work on organic semiconductors as photonic sensors within the European project IFLEXIS; responsible for the Atomic Force Microscopy lab; development of stretchable sensors for bioelectronics
March 2011 - April 2014	Postdoctoral research in the group of Prof. F. Biscarini, Centro Nazionale delle Ricerche (CNR), Bologna, Italy; focus on organic electronics and sensor device physics, measurement setup and data analysis for research in organic bioelectronics and neuronal interfaces, workpackage leader in European Project I-ONE-FP7 and Italian project Nanomax-Chem.
September 2010 - January 2011	Consultant and translator, E4 Computer Engineering, Scandiano, Italy; High Performance Computing.
October 2009 - February 2011	Programmer (part-time) in the group of C. Helma, Institute for Advanced Studies, University of Freiburg, Germany; Machine Learning and Data Analysis. Work in the framework of the EU-research project OpenTox.
July 2009 - August 2009	Visiting scientist in the group of David A. Case, The Scripps Research Institute, San Diego, USA. Modelling of Charge Transfer Phenomena at the liquid-solid Interface
January 2007 - December 2009	Postdoctoral research in the group of Prof. F. Zerbetto, University of Bologna, Italy; research on organic electronics, biosensors (within the EU-research project BIODOT), interfacial water

EDUCATION

January 2009 - July 2010	Trainee teacher for physics, chemistry and technology at the Scheffel-Gymnasium Lahr (high-school), Germany; German State Examination for Teaching (grade: 'sehr gut' - equivalent to A)
January 2004 - Mai 2006	PhD degree (grade: 'summa cum laude'); thesis: 'DNA Charge Transfer: An Atomistic Model'; supervisors: Prof. T. Koslowski, Institute for Physical Chemistry and Prof. A. Blumen, Institute for Physics, University of Freiburg, Germany
October 1997 -	'Diplom' in Chemistry (equivalent to Master Degree, grade: 'sehr gut' -

November 2003	equivalent to A); thesis: 'Structural Analysis of Surface Bound Polymer Films'; thesis supervisors: Prof. J. R�uhe, Institute for Chemistry and Physics of Interfaces, Freiburg, Germany
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INVITED SCIENTIFIC TALKS; TEACHING ACTIVITY; CONFERENCE ORGANIZATION

Since 2024	teaching: "Microscopy Laboratory Class" for Bachelor in Materials Sciences
since 2020	teaching: "Advanced Skills for Physics Related Professions" Master Degree Class in Physics, University of Bologna, Italy
since 2020	teaching: "Applied Physics" Undergraduate Class, University of Bologna, Italy
since 2017	teaching: "Laboratory of Nanoscience and Technology" Master Degree Class in Physics, University of Bologna, Italy
September 2025	Invited: "Electrochemical Strain Wave Microscopy for Mapping Mixed Ionic-Electronic Transport", Nanoscientific Forum Europe (NSFE 2025), Paris, France
September 2025	Invited: "Dissipative Charge Transport in Organic Mixed Ionic-Electronic Conductor Channels", Orbitaly conference, Brescia, Italy
February 2025	Invited: "Conjugated Polymers for Bioelectronics: Where Ions and Electrons Meet", Scientific Colloquia, University of Bayreuth, Germany
May 2023	Invited: "Quantitative imaging of electroswelling in organic mixed ionic electronic conductors", Workshop on Piezoelectric Force Microscopy, Lens, France
September 2022	Invited: "Organic Bioelectronic Interfaces Investigated by Multichannel Scanning Probe Microscopies", Orbitaly conference, Erice, Italy
May 2022	Invited: "Polymer semiconductor/electrolyte interfaces: novel concepts for biomedical transducers", GEP-SLAP2022 conference, San Sebastian, Spain
January 2021	invited: "Scanning Electrochemical Microscopy applied to Organic Electrochemical Transistors", BORGES Winter Training Workshop
June 2020	invited: "Organic Optobioelectronics: Transducing Light into Biosignals", Smart Sensing – Non Classical Biology Workshop.
October 2019	invited: "Charge Transport Processes in Organic Electronic Photocapacitors for Neuronal Stimulation", ORBITALY workshop 2019.
October 2018	invited: "Atomic Force Microscopies to study Electronic Properties and Strain in Thin Films for Flexible Electronics", Nanoscientific Forum Europe, Freiberg, Germany
September 2018	invited: "Elastic microelectrodes for bioelectronic recording from peripheral nerves", Orbitaly 2018, Milano, Italy

SCIENTIFIC OUTPUT

currently	+70 articles and book chapters, h-index: 35, +4400 citations (google scholar 09/2025) – https://scholar.google.com/citations?user=81p_iH4AAAAJ&hl=en 2 patents in the field of flexible electronics: PCT/IT2017/000050: "Sensitive field effect device and manufacturing method thereof"; EP17160942.3 "Active implantable multifunctional device on biodegradable/bioresorbable scaffold for loco-regional therapy of neurodegenerative diseases" Review activity for Advanced Materials, Small, ACS Materials and
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Interfaces and more (+10 different material science journals) see
<https://orcid.org/0000-0002-5993-3388>

Bonafè, F., Bazzani, M., Fraboni, B. & Cramer, T. Dissipative charge transport in organic mixed ionic-electronic conductor channels. *Nat. Commun.* **16**, 2499 (2025).

D'Amico, L. G. *et al.* Fully Passive Electrochemical Oxygen Sensor Enabled With Organic Electrochemical Transistor. *Adv. Mater. Technol.* **2401875**, 1–9 (2025)

Pacilio, S. *et al.* Ion-Permeable Electrospun Scaffolds Enable Controlled In-Vitro Electrostimulation Assay of Myoblasts. *Adv. Mater. Interfaces* **2400601**, 1–8 (2024).

Zhang, C. *et al.* Organic Mixed Ionic Electronic Conductor Nanochannels for Vertical Electrochemical and Ionic Transistors. *Adv. Electron. Mater.* **10**, 1–8 (2024).

Bonafè, F., Decataldo, F., Cramer, T. & Fraboni, B. Ionic Solvent Shell Drives Electroactuation in Organic Mixed Ionic-Electronic Conductors. *Adv. Sci.* **11**, 1–8 (2024).

Fabbri, L. *et al.* Accurate determination of band tail properties in amorphous semiconductor thin film with Kelvin probe force microscopy. *APL Mater.* **11**, 061123 (2023).

F. Bonafè, F. Decataldo, I. Zironi, D. Remondini, T. Cramer, and B. Fraboni, "AC amplification gain in organic electrochemical transistors for impedance-based single cell sensors," *Nat. Commun.*, vol. 13, p.1–9, **2022**.

T. Paltrinieri, L. Bondi, V. Đerek, B. Fraboni, E. D. Głowacki, and T. Cramer, "Understanding Photocapacitive and Photofaradaic Processes in Organic Semiconductor Photoelectrodes for Optobioelectronics," *Adv. Funct. Mater.*, vol. 2010116, **2021**.

T. Cramer, "Learning with brain chemistry," *Nat. Mater.*, vol. 19, no. 9, pp. 934–935, **2020**.

F. Mariani, F. Conzuelo, T. Cramer, I. Gualandi, L. Possanzini, M. Tessarolo, B. Fraboni, W. Schuhmann, and E. Scavetta, "Microscopic Determination of Carrier Density and Mobility in Working Organic Electrochemical Transistors," *Small*, vol. 15, no. 42, pp. 1–10, **2019**

F. Decataldo, T. Cramer, D. Martelli, I. Gualandi, W. S. Korim, *et al.*, "Stretchable Low Impedance Electrodes for Bioelectronic Recording from Small Peripheral Nerves," *Sci. Rep.*, vol. 9, no. 1, pp. 1–9, **2019**.

T. Cramer, I. Fratelli, P. Barquinha, A. Santa, C. Fernandes, *et al.*, "Passive radiofrequency x-ray dosimeter tag based on flexible radiation-sensitive oxide field-effect transistor," *Sci. Adv.*, vol. 4, no. 6, p. eaat1825, **2018**.

D. Rand, M. Jakešová, G. Lubin, I. Vebraite, M. David-Pur, *et al.*, "Direct Electrical Neurostimulation with Organic Pigment Photocapacitors," *Adv. Mater.*, vol. 1707292, pp. 1–11, **2018**.

A. Ciavatti, T. Cramer, M. Carroli, L. Basiricò, R. Fuhrer, D. M. De Leeuw, and B. Fraboni, "Dynamics of direct X-ray detection processes in high-Z Bi₂O₃nanoparticles-loaded PFO polymer-based diodes," *Appl. Phys. Lett.*, vol. 111, no. 18, **2017**.

T. Cramer, L. Travagli, S. Lai, L. Patruno, S. De Miranda, A. Bonfiglio, P. Cosseddu, and B. Fraboni, "Direct imaging of defect formation in strained organic flexible electronics by Scanning Kelvin Probe Microscopy," *Sci. Rep.*, vol. 6, no. December, p. 38203, **2016**.

Selected recent publications

L. Basiricò, A. Ciavatti, T. Cramer, P. Cosseddu, A. Bonfiglio, and B. Fraboni, "ARTICLE Direct X-ray photoconversion in flexible organic thin film devices operated below 1 V," *Nat. Commun.*, vol. 7, **2016**.

T. Cramer, A. Sacchetti, M. T. Lobato, P. Barquinha, V. Fischer, *et al.*, "Radiation-Tolerant Flexible Large-Area Electronics Based on Oxide Semiconductors," *Adv. Electron. Mater.*, vol. 2, no. 7, pp. 1–8, **2016**.

RESEARCH PROJECTS - FUNDING

2025-2028	EU-HORIZON-MSCA-Global Fellowship – Supervisor, Project: "Scalable real-time monitoring of 3D cell cultures with electrical impedance microtomography" (MITO)
2019 - 2023	EU-HORIZON 2020 - FET-OPEN (role: principal investigator University of Bologna) "Light and Organic Nanotechnology for Cardiovascular Disease (LIONHEARTED)"
2023	Alma-Idea: "Matrici di nano-trasduttori per interfacce bioelettroniche con controllo a circuito chiuso"
2014 - 2017	EU-FP7 – ICT (role: research of University of Bologna) title: "Integrated Flexible Photonic Sensor System (iFLEXIS)"

Bologna, 03/10/2025



Dr. Tobias Cramer