



Part A. PERSONAL DATA

Date of CV

6/10/2024

Name	Pau		
Surname	Gorostiza		
Gender	male	Birthdate (dd/mm/yyyy)	20/08/1969
ID number	-		
Email	pau@icrea.cat	URL Web	IBEC
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-7268-5577		

A.1. Present professional situation

Position	ICREA research professor and group leader		
Initial date	01/01/2008		
Institution	Institut de Bioenginyeria de Catalunya (IBEC)		
Department	Nanoprobes and nanoswitches		
State	Spain	Teléfono	+34 934 020 208
Keywords	chemical biology, electrochemistry, neuroscience, nanotechnology		

A.3. Academic training

Degree/Master/Thesis	University	Year
BsC physics	Universitat de Barcelona	1992
PhD physics	Universitat de Barcelona	1999
European PhD	Universitat de Barcelona	2001

Part B. SUMMARY OF CV

Pau Gorostiza graduated in physics at the University of Barcelona (UB), where he also obtained his PhD (European Doctorate) in the field of semiconductor electrochemistry. He also worked at the microscopy facility of the UB, where he gained experience in force microscopy and spectroscopy of biological samples, as well as in nanotechnology applied to materials science. He has visited the CNRS and the University Pierre and Marie Curie in Paris (France), and the University of California at Berkeley (USA), where he switched his research interests toward ion channel electrophysiology and chemical biology, specifically on photopharmacological manipulation of proteins for remotely controlling biological activity. He is currently ICREA Research Professor at the Institute for Bioengineering of Catalonia (IBEC), where he develops light regulated ligands of neuronal proteins, and studies electron transfer in redox proteins and photosynthetic complexes using EC-STM/AFM. He has published more than 120 articles in international peer-reviewed journals including Nature, Science, Nature Materials, Nature Chemistry, Nature Chemical Biology, Nature Communications, JACS, Angewandte Chemie and several highly cited review articles in optogenetics and photopharmacology. His publications (most belonging to the first decile of their respective fields) received more than 7420 citations and give an h-index of 46 (Scholar). In addition, he has given several invited lectures (including Heraeus Seminar on Electrochemical Surface Science, Lorenz Workshop on Optogenetics, Bunsen Discussion meeting / Gerischer-Kolb Symposium on Bioelectrochemistry, and Bioelectrochemical Society) and organized 8 international workshops. He has participated in more than 50 competitive research grants, and he is principal investigator of 6 Spanish grants (CTQ2008-06160, CTQ2008-03129-E/BQU and PET2006-0808, DEEP RED), 10 European grants (ERC-StG-2007-210355, ERC-2012-PoC-335011, FP7-ICT-2009-270483, FP7-2010-IRG-277182 and FP7-IIF-2008-235255, ERA-net SynBio, Human Brain Project, DEEPER H2020-ICT-36-2020-RIA-101016787, PHOTOTHERAPORT EIC-Pathfinder Open) and 6 private foundation grants (Fundación Cobos, RecerCaixa, Marató TV3, Ramón Areces, Fundaluce, CaixaHealth). They include a Career Development Award of the Human Frontier Science Program (HFSP), European Research Council (ERC) Starting and Proof of Concept Grants, and coordination of an European Innovation Council grant. He holds 9 patents, 5 of which are licensed. He has supervised 14 postdoctoral fellows and 15 PhD theses and is currently supervising 8 PhD students.

Pau Gorostiza is expert in the development and transfer of neurotechnologies aimed at the remote and non-invasive modulation of the nervous system. Recent examples include pioneering work on [multiphoton stimulation](#), [remote control of brain states](#), contributions to [cochlear implants](#), [retinal implants](#), and drug development (based on target structure and artificial intelligence, medicinal chemistry, *in vitro* and *in vivo* assays) for relevant neuronal targets like [glutamatergic](#), [GABAergic](#), [glycinergic](#), [muscarinic](#), [adrenergic](#), and [dopaminergic](#) receptors.

Part C. LIST OF MAIN CONTRIBUTIONS

C.1. Publications in peer reviewed journals and books (2019-2024)

Light-Activated Agonist-Potentiator of GABA_A Receptors for Reversible Neuroinhibition in Wildtype Mice. Maleeva G, Nin-Hill A, Wirth U, Rustler K, Ranucci M, Opar E, Rovira C, Bregestovski P, Zeilhofer HU, König B, Alfonso-Prieto M*, **Gorostiza P***. J Am Chem Soc 2024, in press.

Photo-BQCA: Positive Allosteric Modulators Enabling Optical Control of the M1 Receptor. Gerwe H, Schaller E, Sortino R, Opar E, Martínez-Tambella J, Bermudez M, Lane JR, **Gorostiza P**, Decker M*. Angew Chem Int Ed Engl. 2024 Aug 13:e202411438. doi: 10.1002/anie.202411438.

Photoelectrochemical Two-Dimensional Electronic Spectroscopy (PEC2DES) of Photosystem I: Charge Separation Dynamics Hidden in a Multichromophoric Landscape. López-Ortiz M, Bolzonello L, Bruschi M, Fresch E, Collini E, Hu C, Croce R, van Hulst NF*, **Gorostiza P***. ACS Appl Mater Interfaces. 2024 Aug 21;16(33):43451-43461. doi: 10.1021/acsami.4c03652. Epub 2024 Aug 9.

In vivo photocontrol of orexin receptors with a nanomolar light-regulated analogue of orexin-B. Prischich D, Sortino R, Gomila-Juaneda A, Matera C, Guardiola S, Nepomuceno D, Varese M, Bonaventure P, de Lecea L, Giralt E, **Gorostiza P***. Cell Mol Life Sci. 2024 Jul 6;81(1):288. doi: 10.1007/s00018-024-05308-x.

Photoswitchable carbamazepine analogs for non-invasive neuroinhibition in vivo. Camerin L, Maleeva G, Gomila-Juaneda A, Suárez-Pereira I, Matera C, Prischich D, Opar E, Riefolo F, Berrocoso E, **Gorostiza P***. Angew Chem Int Ed Engl. 2024 Jun 18:e202403636. doi: 10.1002/anie.202403636.

Three-Photon Infrared Stimulation of Endogenous Neuroreceptors in Vivo. Sortino R, Cunquero M, Castro-Olvera G, Gelabert R, Moreno M, Riefolo F, Matera C, Fernández-Castillo N, Agnetta L, Decker M, Lluch JM, Hernando J, Loza-Alvarez P*, **Gorostiza P***. Angew Chem Int Ed Engl. 2023 Dec 18;62(51):e202311181. doi: 10.1002/anie.202311181

The Protein Matrix of Plastocyanin Supports Long-Distance Charge Transport with Photosystem I and the Copper Ion Regulates Its Spatial Span and Conductance. López-Ortiz M, Zamora RA, Giannotti MI, **Gorostiza P***. ACS Nano. 2023 Oct 24;17(20):20334-20344. doi: 10.1021/acsnano.3c06390

Light-dependent inhibition of clathrin-mediated endocytosis in yeast unveils conserved functions of the AP2 complex. Prischich D, Camarero N, Encinar Del Dedo J, Cambra-Pellejà M, Prat J, Nevola L, Martín-Quirós A, Rebollo E, Pastor L, Giralt E, Geli MI*, **Gorostiza P***. iScience. 2023 Sep 12;26(10):107899. doi: 10.1016/j.isci.2023.107899.

Ratiometric Nanothermometer Based on a Radical Excimer for In Vivo Sensing. Blasi D, Gonzalez-Pato N, Rodriguez Rodriguez X, Diez-Zabala I, Srinivasan SY, Camarero N, Esquivias O, Roldán M, Guasch J, Laromaine A, **Gorostiza P**, Veciana J*, Ratera I*. Small. 2023 Aug;19(32):e2207806. doi: 10.1002/smll.202207806

Phosphorylation disrupts long-distance electron transport in cytochrome c. Gomila AMJ, Pérez-Mejías G, Nin-Hill A, Guerra-Castellano A, Casas-Ferrer L, Ortiz-Tescari S, Díaz-Quintana A, Samitier J, Rovira C, De la Rosa MA, Díaz-Moreno I*, **Gorostiza P***, Giannotti MI*, Lagunas A*. Nat Commun. 2022 Nov 19;13(1):7100. doi: 10.1038/s41467-022-34809-1.

Determination of the nanoscale electrical properties of olfactory receptor hOR1A1 and their dependence on ligand binding: Towards the development of capacitance-operated odorant biosensors. Lagunas A*, Belloir C, Briand L, **Gorostiza P**, Samitier J*. Biosens Bioelectron. 2022 Sep 28;218:114755. doi: 10.1016/j.bios.2022.114755.

Reversible Photocontrol of Dopaminergic Transmission in Wild-Type Animals. Matera C, Calvé P, Casadó-Anguera V, Sortino R, Gomila AM, Moreno E, Gener T, Delgado-Sallent C, Nebot P, Costazza D, Conde-Berriozabal S, Masana M, Hernando J, Casadó V, Puig V, **Gorostiza P***. Int J Mol Sci. 2022 Sep 4;23(17):10114. doi: 10.3390/ijms231710114.

Light- and Redox-Dependent Force Spectroscopy Reveals that the Interaction between Plastocyanin and Plant Photosystem I Is Favored when One Partner Is Ready for Electron Transfer. Zamora RA, López-Ortiz M, Sales-Mateo M, Hu C, Croce R, Maniyara RA, Pruneri V, Giannotti MI*, **Gorostiza P***. ACS Nano. 2022 Sep 27;16(9):15155-15164. doi: 10.1021/acsnano.2c06454.

Donor-Acceptor Stenhouse Adduct Displaying Reversible Photoswitching in Water and Neuronal Activity. Castagna R, Maleeva G, Pirovano D, Matera C, **Gorostiza P***. J Am Chem Soc. 2022 Aug 31;144(34):15595-15602. doi: 10.1021/jacs.2c04920.

Fast Photoswitchable Molecular Prosthetics Control Neuronal Activity in the Cochlea. Garrido-Charles A, Huet A, Matera C, Thirumalai A, Hernando J, Llebaria A, Moser T*, **Gorostiza P***. J Am Chem Soc. 2022 Jun 1;144(21):9229-9239. doi: 10.1021/jacs.1c12314.

Distance and Potential Dependence of Charge Transport Through the Reaction Center of Individual Photosynthetic Complexes. López-Ortiz M, Zamora RA, Giannotti MI, Hu C, Croce R, **Gorostiza P***. Small. 2022 Feb;18(7):e2104366. doi: 10.1002/smll.202104366.

Rational Design of Photochromic Analogues of Tricyclic Drugs. Riefolo F, Sortino R, Matera C, Claro E, Preda B, Vitiello S, Traserra S, Jiménez M, **Gorostiza P***. J Med Chem. 2021 Jul 8;64(13):9259-9270. doi: 10.1021/acs.jmedchem.1c00504

Control of Brain State Transitions with a Photoswitchable Muscarinic Agonist. Barbero-Castillo A, Riefolo F, Matera C, Caldas-Martínez S, Mateos-Aparicio P, Weinert JF, Garrido-Charles A, Claro E, Sanchez-Vives MV*, **Gorostiza P***. Adv Sci (Weinh). 2021;8:e2005027. doi: 10.1002/adv.202005027.

Fast Photo-Chrono-Amperometry of Photosynthetic Complexes for Biosensors and Electron Transport Studies. López-Ortiz M, Zamora RA, Antinori ME, Remesh V, Hu C, Croce R, van Hulst NF*, **Gorostiza P***. ACS Sens. 2021 Feb 26;6(2):581-587. doi: 10.1021/acssensors.1c00179.

Adrenergic Modulation With Photochromic Ligands. Prischich D, Gomila AMJ, Milla-Navarro S, Sangüesa G, Diez-Alarcia R, Preda B, Matera C, Batlle M, Ramírez L, Giralt E, Hernando J, Guasch E, Meana JJ, de la Villa P, **Gorostiza P***. Angew Chem Int Ed Engl. 2021, 60(7):3625-3631. doi: 10.1002/anie.202010553.

Photocontrol of Endogenous Glycine Receptors In Vivo. Gomila AMJ, Rustler K, Maleeva G, Nin-Hill A, Wutz D, Bautista-Barrufet A, Rovira X, Bosch M, Mukhametova E, Petukhova E, Ponomareva D, Mukhamedyarov M, Peiretti F, Alfonso-Prieto M, Rovira C, König B*, Bregestovski P*, **Gorostiza P***. Cell Chemical Biology, 2020, 21:S2451.

Photoswitchable dynasore analogs to control endocytosis with light. Núria Camarero, Ana Trapero, Ariadna Pérez-Jiménez, Eric Macia, Alexandre Gomila-Juaneda, Andrés Martín-Quirós, Laura Nevola, Artur Llobet, Amadeu Llebaria, Jordi Hernando, Ernest Giralt*, **Pau Gorostiza***. Chemical Science, 2020, 11:8981.

Electrochemically Gated Long-Distance Charge Transport in Photosystem I. López-Martínez M, López-Ortiz M, Antinori ME, Wientjes E, Nin-Hill A, Rovira C, Croce R, Díez-Pérez I, **Gorostiza P***. Angew Chem Int Ed Engl. 2019, 58:13280.

Reversible silencing of endogenous receptors in intact brain tissue using 2-photon pharmacology. Pittolo S, Lee H, Lladó A, Tosi S, Bosch M, Bardia L, Gómez-Santacana X, Llebaria A, Soriano E, Colombelli J, Poskanzer KE, Perea G, **Gorostiza P***. Proc Natl Acad Sci U S A. 2019, 116:13680.

Long distance electron transfer through the aqueous solution between redox partner proteins Lagunas A, Guerra-Castellano A, Nin-Hill A, Díaz-Moreno I, De la Rosa MA, Samitier J, Rovira C, **Gorostiza P***. Nature Communications 2018, 9:5157.

Photoswitchable Antimetabolite for Targeted Photoactivated Chemotherapy. Matera C; Gomila AMJ; Camarero N; Libergoli M; Soler C; **Gorostiza P***. Journal Of The American Chemical Society, 2018, 140:46:15764 - 15773.

C.3. Grants and research lines (2019-2024).

1. Reference: PID2022-142609OB-I00. Título: desarrollo de fármacos inhibitorios fotoconmutables y métodos de iluminación no invasiva para neuromodulación y estudios de circuitos neuronales (EPILLUM). IP: Pau Gorostiza. Entidad financiadora: MICINN. Duración: 1/9/2023-31/8/2026.

2. Reference: 101130883. Título: Luminescent implants as ports for light-based therapies (PHOTOTHERAPORT). IP and coordinator: Pau Gorostiza. Entidad financiadora: European Commission (HORIZON-EIC-2023-PATHFINDEROPEN-01). Duración: 1/1/2024-31/12/2026.

3. Reference: LCF/PR/HR19/52160010. Título: Light-regulated drugs to restore sight (DRUG4SIGHT). IP y coordinador: Pau Gorostiza. Entidad financiadora: La Caixa Foundation (Health Research 2018). Duración: 01/10/2019 - 01/10/2023

4. Reference: H2020-ICT-36-2020-RIA-101016787. Título: Deep brain photonic tools for cell-type specific targeting of neural diseases (DEEPER). IP: Pau Gorostiza. H2020 - Excellent Science. Duración: 1/11/2020 - 31/10/2024.
5. Reference: HBPSGA1 (720270). Título: Human Brain Project Specific Grant Agreement 1. IP: Pau Gorostiza. H2020 - Excellent Science. Duración: 01/04/2016 - 31/03/2018.
6. Reference: HBPSGA2 (785907). Título: Human Brain Project Specific Grant Agreement 2. IP: Pau Gorostiza. H2020 - Excellent Science. Duración: 01/04/2018 - 31/03/2020.
7. Reference: HBPSGA3 (945539). Título: Human Brain Project Specific Grant Agreement 3. IP: Pau Gorostiza. H2020 - Excellent Science. Duración: 01/04/2020 - 31/03/2022.
8. Reference: PID2019-111493RB-I00. Título: Neuromodulation of inhibitory pathways using photopharmacology activated with red and infrared light (DEEP RED). IP: Pau Gorostiza. Entidad financiadora: MINECO (Proyectos I+D+I, Retos de la sociedad). Duración: 1/7/2020 - 30/6/2023.
9. Reference: CTQ2013-43892-R. Título: Prótesis moleculares para restablecer la visión basadas en fotoconmutadores covalentes dirigidos. IP: Pau Gorostiza. Entidad financiadora: MINECO. Duración: 30/12/2016 - 29/12/2019.
10. Reference FUNDALUCE. Título: Fotoconmutadores covalentes para el control remoto de receptores endógenos. IP: Pau Gorostiza. Ayudas a la Investigación FundaLuCe. Duración: 2017-2019.

C.4. Participation in technology transfer activities

- Patent: ND. Number: EP23382211.3, Inventors: ND. Institutions: ND. Priority: Europe. Date: 2023.
- Patent: ND. Number: EP23382494.5. Inventors: ND. Institutions: ND. Priority: Europe. Date: 2023.
- Patent: Photoisomerizable derivatives of dihydrofolate reductase inhibitors. Number: EP17382894.8. Inventors: **Gorostiza, P.**; Soler, C.; Matera, C.; Camarero, N.; Libergoli, M.; Gomila, A. Holding institution: IBEC, UB, CIBER. Priority country: Europe. Date: 2017.
- Patent: Glutamate Receptor Photomodulators. Number: EP13382374.0 Inventors: Llebaria, A.; **Gorostiza, P.**; Giraldo, J.; Gómez-Santacana, Xavier; Pittolo, S.; Rovira, X.; Goudet, C. Holding institution: CSIC, IBEC, UAB, CNRS. Priority country: Europe. Date: 2013.
- Patent: Photoreactive regulator of protein function and methods of use thereof. Number: Application 61/016,233. Inventors: Dirk Trauner, Ehud Isacoff, Richard Kramer, Matthew Volgraf, Matthew Banghart, Doris Fortin, **Pau Gorostiza**. Holding institution: UNCA - University of California. Priority country: United States of America. Date: 2008.
- Patent: Photoreactive regulator of protein function and methods of use thereof. Number: 8,178,496. Inventors: Dirk Trauner, Ehud Isacoff, Matthew Volgraf, **Pau Gorostiza**. Holding institution: UNCA - University of California. Priority country: United States of America. Date: 2008. Licensed to Photoswitch Biosciences, Inc (2017).
- Patent: Photoreactive regulator of protein function and methods of use thereof. Number: 9,629,911. Inventors: Richard Kramer, Ehud Isacoff, Dirk Trauner, Katherine Borges, Matthew Banghart, Matthew Volgraf, **Pau Gorostiza**. Holding institution: UNCA - University of California. Priority country: United States of America. Date: 2005. Licensed to Photoswitch Biosciences, Inc (2017).
- Patent: Photoreactive regulator of protein function and methods of use thereof. Number: 9,097,707. Inventors: Richard Kramer, Ehud Isacoff, Dirk Trauner, Katherine Borges, Matthew Banghart, Matthew Volgraf, **Pau Gorostiza**. Holding institution: UNCA - University of California. Priority country: United States of America. Date: 2005. Licensed to Photoswitch Biosciences, Inc (2017).
- Patent: Photoreactive regulator of protein function and methods of use thereof. Number: 8,309,350. Inventors: Richard Kramer, Ehud Isacoff, Dirk Trauner, Katherine Borges, Matthew Banghart, Matthew Volgraf, **Pau Gorostiza**. Holding institution: UNCA - University of California. Priority country: United States of America. Date: 2005. Licensed to Photoswitch Biosciences, Inc (2017).
- Patent: Photoreactive regulator of protein function and methods of use thereof. Number: 8,114,843. Inventors: Richard Kramer, Ehud Isacoff, Dirk Trauner, Katherine Borges, Matthew Banghart, Matthew Volgraf, **Pau Gorostiza**. Holding institution: UNCA - University of California. Priority country: United States of America. Date: 2005. Licensed to Photoswitch Biosciences, Inc (2017).