

# Federico Williams

## Curriculum Vitae

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### Positions

March 2007–. Associate Professor (2018–), Assistant Professor (2007–2018), Departamento de Química Inorgánica, Analítica y Química Física, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires.

January 2006–. Researcher of the National Research Council (CONICET), Principal Researcher (2019–), Independent Researcher (2006–2019).

September 2018–September 2019. Guest Professor (Mercator Fellow DFG), Lehrstuhl für Physikalische Chemie II, Department Chemie und Pharmazie, Universität Erlangen-Nürnberg, Germany.

October 2001–July 2005. Trapnell Fellow, King's College, University of Cambridge.

### Postdoctoral Fellowships

October 2003–July 2005. 'Early Career Fellowship', Leverhulme Trust, Department of Chemistry, University of Cambridge.

October 2000–October 2003. 'Oppenheimer Research Fellowship', Department of Chemistry, University of Cambridge.

### Education

1997–2001. PhD, Chemistry Department, University of Cambridge, United Kingdom. Fundamentals and new applications of electrochemical promotion in catalysis (Doctoral thesis). <https://doi.org/10.17863/CAM.12897>

1991–1996. Licenciado en Química, Universidad Nacional de Mar del Plata, Argentina.

### Research Funding

Septiembre 2021– Estudios experimentales y teóricos sobre la estructura electrónica de superficies de TiO<sub>2</sub> modificadas con oligómeros de polipiridinas de rutenio. Proyecto: PIP 11220200101005CO. CONICET.

Enero 2020– Estudios fundamentales sobre la reactividad química de porfirinas unidas a superficies. Proyecto: UBACyT 20020190100028BA. Universidad de Buenos Aires.

June 2020– Estudios fundamentales sobre la interacción de porfirinas con superficies. Proyecto: PICT 2018 Nro 3276. Agencia Nacional de Promoción de la Investigación, el Desarrollo Tecnológico y la Innovación.

Abril 2014–Abril 2016. Investigation of the surface-mediated metalation and demetalation of porphyrin molecules. Ministerio de Ciencia, Tecnología e Innovación Productiva.

October 2012–April 2014. Interaction of metallic nanoparticles with biomimetic membranes supported over solid substrates. Funding Agency: National Agency for Science and Technology Promotion.

April 2010–April 2012. Development of chemical nanosensors and smart coatings for the early detection of environmental relevant molecules. Funding Agency: National Scientific and Technical Research Council.

October 2010–October 2012. Nanostructured surfaces. Funding Agency: Universidad de Buenos Aires.

## Awards

2018. Mercator Fellowship Deutsche Forschungsgemeinschaft, Germany.
2016. Dr. Rafael A. Labriola Award in Chemistry. Asociación Química Argentina.
2013. Ranwel Caputto Award in Physical Chemistry. Academia Nacional de Ciencias, Argentina.
2009. Eduardo G. Gros Award in Chemistry. Academia Nacional de Ciencias Exactas Físicas y Naturales.
2008. Innovar Award in Applied Research together with M. Vago, M. Tagliacruzchi and E. J. Calvo, Ministry of Science and Technology, Argentina.

## Publicaciones

121. S. E. Herrera, M. Tagliacruzchi, F. J. Williams, and E. J. Calvo, "Pt nanoparticles in polyelectrolyte multilayers: polymer effects on the electrocatalytic activity for methanol oxidation", *Journal of Electroanalytical Chemistry* **938**, 117430 (2023).
120. A. Calvo, L. Andrini, F. J. Williams, J. M. Ramallo-López, G. J. A. A. Soler-Illia, and F. G. Requejo, "Controlling the local-ensemble structure in mesoporous hybrid titania-silica thin films containing aminopropyl groups", *Journal of Sol-Gel Science and Technology* **102**, 172–184 (2022).
119. C. C. Fernández, D. Wechsler, O. Lytken, H.-P. Steinrück, and F. J. Williams, "Self-metalation of monophosphonic acid tetraphenylporphyrin on TiO<sub>2</sub>(110)-(1x1)", *Surface Science* **717**, 122005 (2022).
118. E. Y. Kataev, L. Fromm, Q. Tariq, D. Wechsler, F. J. Williams, N. Tsud, S. Franchi, H.-P. Steinrück, A. Görling, and O. Lytken, "Anchoring of phthalic acid on MgO(100)", *Surface Science* **720**, 122007 (2022).
117. J. Köbl, C. C. Fernández, L.-M. Augustin, E. Y. Kataev, S. Franchi, N. Tsud, C. Pistonesi, M. E. Pronsato, N. Jux, O. Lytken, F. J. Williams, and H.-P. Steinrück, "Benzohydroxamic acid on rutile TiO<sub>2</sub>(110)-(1x1)– a comparison of ultrahigh-vacuum evaporation with deposition from solution", *Surface Science* **716**, 121955 (2022).
116. J. Köbl, D. Wechsler, E. Y. Kataev, F. J. Williams, N. Tsud, S. Franchi, H.-P. Steinrück, and O. Lytken, "Corrigendum: Adsorption of phenylphosphonic acid on rutile TiO<sub>2</sub>(110)", *Surface Science* **717**, 122004 (2022).
115. L. Maldonado, S. E. Herrera, F. J. Williams, and M. Tagliacruzchi, "Thickness Fluctuations Produce Apparent Long-Range Tunneling in Large-Area Junctions: The Case of Polyelectrolyte Multilayers", *The Journal of Physical Chemistry C* **126**, 9956–9964 (2022).
114. A. Y. Tesio, W. Torres, M. Villalba, F. Davia, M. del Pozo, D. Córdoba, F. J. Williams, and E. J. Calvo, "Role of Superoxide and Singlet Oxygen on the Oxygen Reduction Pathways in Li-O<sub>2</sub> Cathodes at Different Li<sup>+</sup> Ion Concentration", *ChemElectroChem* **9**, e202201037 (2022).
113. A. Wolfram, Q. Tariq, C. C. Fernández, M. Muth, M. Gurrath, D. Wechsler, M. Franke, F. J. Williams, H.-P. Steinrück, B. Meyer, and O. Lytken, "Adsorption energies of porphyrins on MgO(100): An experimental benchmark for dispersion-corrected density-functional theory", *Surface Science* **717**, 121979 (2022).
112. F. G. Davia, C. C. Fernández, F. J. Williams, and E. J. Calvo, "Effect of porosity and active area on the assessment of catalytic activity of non-precious metal electrocatalyst for oxygen reduction", *Journal of Physics: Condensed Matter* **33**, 324001 (2021).
111. C. C. Fernández, M. Franke, H.-P. Steinrück, O. Lytken, and F. J. Williams, "Demetalation of Surface Porphyrins at the Solid-Liquid Interface", *Langmuir* **37**, 852–857 (2021).
110. D. Wechsler, C. C. Fernández, J. Köbl, L.-M. Augustin, C. Stumm, N. Jux, H.-P. Steinrück, F. J. Williams, and O. Lytken, "Wet-Chemically Prepared Porphyrin Layers on Rutile TiO<sub>2</sub>(110)", *Molecules* **26**, 2871 (2021).

109. D. Wechsler, P. Vensaus, N. Tsud, H.-P. Steinrück, O. Lytken, and F. J. Williams, "Surface Reactions and Electronic Structure of Carboxylic Acid Porphyrins Adsorbed on  $\text{TiO}_2(110)$ ", *The Journal of Physical Chemistry C* **125**, 6708–6715 (2021).
108. F. G. Davia, N. P. Johner, E. J. Calvo, and F. J. Williams, "Growth and electrochemical stability of a layer by layer thin film containing tetrasulfonated Fe phthalocyanine", *Journal of Electroanalytical Chemistry* **877**, 114485 (2020).
107. E. Kataev, D. Wechsler, F. J. Williams, J. Köbl, N. Tsud, S. Franchi, H.-P. Steinrück, and O. Lytken, "Probing the Roughness of Porphyrin Thin Films with X-ray Photoelectron Spectroscopy", *ChemPhysChem* **21**, 2293–2300 (2020).
106. J. Köbl, D. Wechsler, E. Y. Kataev, F. J. Williams, N. Tsud, S. Franchi, H. P. Steinrück, and O. Lytken, "Adsorption of phenylphosphonic acid on rutile  $\text{TiO}_2(110)$ ", *Surface Science* **698**, 121612 (2020).
105. C. C. Fernández, D. Wechsler, T. C. R. Rocha, H. P. Steinrück, O. Lytken, and F. J. Williams, "Adsorption of Phosphonic–Acid–Functionalized Porphyrin Molecules on  $\text{TiO}_2(110)$ ", *The Journal of Physical Chemistry C* **123**, 10974–10980 (2019).
104. C. C. Fernández, D. Wechsler, T. C. Rocha, H. P. Steinrück, O. Lytken, and F. J. Williams, "Adsorption geometry of carboxylic acid functionalized porphyrin molecules on  $\text{TiO}_2(110)$ ", *Surface Science* **689**, 121462 (2019).
103. F. Greco, S. Shin, F. J. Williams, B. S. J. Heller, F. Maier, and H. P. Steinrück, "Potential Screening at Electrode/Ionic Liquid Interfaces from In Situ X–ray Photoelectron Spectroscopy", *Chemistry–Open*, open.201900211 (2019).
102. S. E. Herrera, F. G. Davia, F. J. Williams, and E. J. Calvo, "Metal Nanoparticle Enhancement of Electron Transfer to Tethered Redox Centers through Self–Assembled Molecular Films", *Langmuir* **35**, 6297–6303 (2019).
101. D. Wechsler, C. C. Fernández, Q. Tariq, N. Tsud, K. C. Prince, F. J. Williams, H. P. Steinrück, and O. Lytken, "Interfacial Reactions of Tetraphenylporphyrin with Cobalt–Oxide Thin Films", *Chemistry–A European Journal* **25**, 13197–13201 (2019).
100. C. C. Fernández, E. Pensa, P. Carro, R. Salvarezza, and F. J. Williams, "Electronic Structure of a Self–Assembled Monolayer with Two Surface Anchors: 6–Mercaptopurine on  $\text{Au}(111)$ ", *Langmuir* **34**, 5696–5702 (2018).
99. S. Herrera, F. Tasca, F. J. Williams, and E. J. Calvo, "Adsorption of Dithiodipyridine Axially Coordinated to Iron(II) Phthalocyanine on  $\text{Au}(111)$  as a New Strategy for Oxygen Reduction Electrocatalysis", *ChemPhysChem* **19**, 1599–1604 (2018).
98. F. Marchini, E. J. Calvo, and F. J. Williams, "Effect of the electrode potential on the surface composition and crystal structure of  $\text{LiMn}_2\text{O}_4$  in aqueous solutions", *Electrochimica Acta* **269**, 706–713 (2018).
97. F. Marchini, F. J. Williams, and E. J. Calvo, "Electrochemical impedance spectroscopy study of the  $\text{Li}_x\text{Mn}_2\text{O}_4$  interface with natural brine", *Journal of Electroanalytical Chemistry* **819**, 428–434 (2018).
96. F. Marchini, F. J. Williams, and E. J. Calvo, "Sustainable Selective Extraction of Lithium Chloride from Natural Brine Using a  $\text{Li}_{1-x}\text{Mn}_2\text{O}_4$  Ion Pump", *Journal of The Electrochemical Society* **165**, A3292–A3298 (2018).
95. D. Wechsler, C. C. Fernández, H. P. Steinrück, O. Lytken, and F. J. Williams, "Covalent Anchoring and Interfacial Reactions of Adsorbed Porphyrins on Rutile  $\text{TiO}_2(110)$ ", *The Journal of Physical Chemistry C* **122**, 4480–4487 (2018).
94. C. C. Fernández, C. Spedalieri, D. H. Murgida, and F. J. Williams, "Surface Influence on the Metalation of Porphyrins at the Solid–Liquid Interface", *The Journal of Physical Chemistry C* **121**, 21324–21332 (2017).
93. S. Herrera, F. Tasca, F. J. Williams, E. J. Calvo, P. Carro, and R. C. Salvarezza, "Surface Structure of 4–Mercaptopurine on  $\text{Au}(111)$ : A New Dense Phase", *Langmuir* **33**, 9565–9572 (2017).

92. N. Mozhzhukhina, F. Marchini, W. R. Torres, A. Y. Tesio, L. P. Mendez De Leo, F. J. Williams, and E. J. Calvo, "Insights into dimethyl sulfoxide decomposition in Li-O<sub>2</sub> battery: Understanding carbon dioxide evolution", *Electrochemistry Communications* **80**, 16–19 (2017).
91. N. Torasso, J. M. Armaleo, M. Tagliazucchi, and F. J. Williams, "Simplified Approach to Work Function Modulation in Polyelectrolyte Multilayers", *Langmuir* **33**, 2169–2176 (2017).
90. C. Ferreyra, F. Guller, F. Marchini, U. Lüders, C. Albornoz, A. G. Leyva, F. J. Williams, A. M. Llois, V. Vildosola, and D. Rubi, "Tuning the electronic properties at the surface of BaBiO<sub>3</sub> thin films", *AIP Advances* **6**, 065310 (2016).
89. C. Ferreyra, F. Marchini, P. Granell, F. Golmar, C. Albornoz, F. Williams, A. Leyva, and D. Rubi, "Growth of (100) highly textured BaBiO<sub>3</sub> thin films on silicon", *Thin Solid Films* **612**, 369–372 (2016).
88. E. A. Franceschini, E. de la Llave, F. J. Williams, and G. J. Soler-Illia, "A simple three step method for selective placement of organic groups in mesoporous silica thin films", *Materials Chemistry and Physics* **169**, 82–88 (2016).
87. M. Franke, F. Marchini, N. Jux, H. P. Steinrück, O. Lytken, and F. J. Williams, "Zinc Porphyrin Metal–Center Exchange at the Solid–Liquid Interface", *Chemistry–A European Journal* **22**, 8520–8524 (2016).
86. F. Marchini, S. E. Herrera, E. J. Calvo, and F. J. Williams, "Surface studies of lithium–oxygen redox reactions over HOPG", *Surface Science* **646**, 154–159 (2016).
85. F. Marchini, D. Rubi, M. del Pozo, F. J. Williams, and E. J. Calvo, "Surface Chemistry and Lithium–Ion Exchange in LiMn<sub>2</sub>O<sub>4</sub> for the Electrochemical Selective Extraction of LiCl from Natural Salt Lake Brines", *The Journal of Physical Chemistry C* **120**, 15875–15883 (2016).
84. M. Franke, F. Marchini, H. P. Steinrück, O. Lytken, and F. J. Williams, "Surface Porphyrins Metalate with Zn Ions from Solution", *The Journal of Physical Chemistry Letters* **6**, 4845–4849 (2015).
83. M. Franke, F. Marchini, L. Zhang, Q. Tariq, N. Tsud, M. Vorokhta, M. Vondráček, K. Prince, M. Röckert, F. J. Williams, H. P. Steinrück, and O. Lytken, "Temperature–Dependent Reactions of Phthalic Acid on Ag(100)", *The Journal of Physical Chemistry C* **119**, 23580–23585 (2015).
82. E. de la Llave, S. E. Herrera, C. Adam, L. P. Méndez De Leo, E. J. Calvo, and F. J. Williams, "Molecular and electronic structure of osmium complexes confined to Au(111) surfaces using a self–assembled molecular bridge", *The Journal of Chemical Physics* **143**, 184703 (2015).
81. F. Marchini, S. Herrera, W. Torres, A. Tesio, F. Williams, and E. Calvo, "Surface Study of Lithium–Air Battery Oxygen Cathodes in Different Solvent–Electrolyte pairs", *Langmuir* **31**, 9236–9245 (2015).
80. C. Aldao, F. Schipani, M. Ponce, E. Joanni, and F. Williams, "Conductivity in SnO<sub>2</sub> polycrystalline thick film gas sensors: Tunneling electron transport and oxygen diffusion", *Sensors and Actuators B: Chemical* **193**, 428–433 (2014).
79. E. de la Llave, R. Clarenc, D. J. Schiffrin, and F. J. Williams, "Organization of Alkane Amines on a Gold Surface: Structure, Surface Dipole, and Electron Transfer", *The Journal of Physical Chemistry C* **118**, 468–475 (2014).
78. E. de la Llave, S. E. Herrera, L. P. Méndez De Leo, and F. J. Williams, "Molecular and Electronic Structure of Self–Assembled Monolayers Containing Ruthenium(II) Complexes on Gold Surfaces", *The Journal of Physical Chemistry C* **118**, 21420–21427 (2014).
77. F. Schipani, M. A. Ponce, E. Joanni, F. J. Williams, and C. M. Aldao, "Study of the oxygen vacancies changes in SnO<sub>2</sub> polycrystalline thick films using impedance and photoemission spectroscopies", *Journal of Applied Physics* **116**, 194502 (2014).
76. P. Scodeller, F. J. Williams, and E. J. Calvo, "XPS Analysis of Enzyme and Mediator at the Surface of a Layer–by–Layer Self–Assembled Wired Enzyme Electrode", *Analytical Chemistry* **86**, 12180–12184 (2014).

75. E. Völker, F. J. Williams, T. Jacob, and D. J. Schiffrin, "ARXPS and DFT studies of thermally induced Pb surface segregation on Au/Cu alloys", *Journal of Alloys and Compounds* **586**, 475–478 (2014).
74. D. A. Capdevila, W. A. Marmisollé, F. J. Williams, and D. H. Murgida, "Phosphate mediated adsorption and electron transfer of cytochrome c. A time-resolved SERR spectroelectrochemical study", *Phys. Chem. Chem. Phys.* **15**, 5386–5394 (2013).
73. E. A. Franceschini, M. M. Bruno, F. J. Williams, F. A. Viva, and H. R. Corti, "High-Activity Mesoporous Pt/Ru Catalysts for Methanol Oxidation", *ACS Applied Materials & Interfaces* **5**, 10437–10444 (2013).
72. W. A. Marmisollé, D. A. Capdevila, E. de la Llave, F. J. Williams, and D. H. Murgida, "Self-Assembled Monolayers of NH<sub>2</sub>-Terminated Thiolates: Order, pK<sub>a</sub>, and Specific Adsorption", *Langmuir* **29**, 5351–5359 (2013).
71. L. P. Méndez De Leo, E. de la Llave, D. Scherlis, and F. J. Williams, "Molecular and electronic structure of electroactive self-assembled monolayers", *The Journal of Chemical Physics* **138**, 114707 (2013).
70. E. A. Franceschini, M. M. Bruno, F. A. Viva, F. J. Williams, M. Jobbágy, and H. R. Corti, "Mesoporous Pt electrocatalyst for methanol tolerant cathodes of DMFC", *Electrochimica Acta* **71**, 173–180 (2012).
69. M. H. Marchena, M. Granada, A. V. Bordoni, M. Joselevich, H. Troiani, F. J. Williams, and A. Wolosiuk, "Organized thiol functional groups in mesoporous core shell colloids", *Journal of Solid State Chemistry* **187**, 97–102 (2012).
68. G. O. Menéndez, E. Cortés, D. Grumelli, L. P. Méndez De Leo, F. J. Williams, N. G. Tognalli, A. Fainstein, M. E. Vela, E. A. Jares-Erijman, and R. C. Salvarezza, "Self-assembly of thiolated cyanine aggregates on Au(111) and Au nanoparticle surfaces", *Nanoscale* **4**, 531–540 (2012).
67. A. M. Ricci, L. P. Méndez De Leo, F. J. Williams, and E. J. Calvo, "Some Evidence for the Formation of an Azo Bond during the Electroreduction of Diazonium Salts on Au Substrates", *ChemPhysChem* **13**, 2119–2127 (2012).
66. E. Völker, E. J. Calvo, and F. J. Williams, "Formation, characterization and electrocatalytic activity of layer-by-layer self-assembled films containing polyoxomolybdate over Au surfaces", *Journal of Electroanalytical Chemistry* **673**, 1–7 (2012).
65. E. Völker, F. J. Williams, E. J. Calvo, T. Jacob, and D. J. Schiffrin, "O<sub>2</sub> induced Cu surface segregation in Au–Cu alloys studied by angle resolved XPS and DFT modelling", *Physical Chemistry Chemical Physics* **14**, 7448 (2012).
64. A. Brunsen, A. Calvo, F. J. Williams, G. J. A. A. Soler-Illia, and O. Azzaroni, "Manipulation of Molecular Transport into Mesoporous Silica Thin Films by the Infiltration of Polyelectrolytes", *Langmuir* **27**, 4328–4333 (2011).
63. E. A. Franceschini, G. A. Planes, F. J. Williams, G. J. Soler-Illia, and H. R. Corti, "Mesoporous Pt and Pt/Ru alloy electrocatalysts for methanol oxidation", *Journal of Power Sources* **196**, 1723–1729 (2011).
62. A. M. Ricci, N. Tognalli, E. de la Llave, C. Vericat, L. P. Méndez De Leo, F. J. Williams, D. Scherlis, R. Salvarezza, and E. J. Calvo, "Electrochemistry of Os(2,2-bpy)<sub>2</sub>ClPyCH<sub>2</sub>NHCOPh tethered to Au electrodes by S–Au and C–Au junctions", *Physical Chemistry Chemical Physics* **13**, 5336 (2011).
61. V. M. Rivas, L. P. Méndez De Leo, M. Hamer, R. Carballo, and F. J. Williams, "Self-Assembled Monolayers of Disulfide Cu Porphyrins on Au Surfaces: Adsorption Induced Reduction and Demetalation", *Langmuir* **27**, 10714–10721 (2011).
60. A. Calvo, M. C. Fuertes, B. Yameen, F. J. Williams, O. Azzaroni, and G. J. A. A. Soler-Illia, "Nanochemistry in Confined Environments: Polyelectrolyte Brush-Assisted Synthesis of Gold Nanoparticles inside Ordered Mesoporous Thin Films", *Langmuir* **26**, 5559–5567 (2010).
59. M. Tagliazucchi, F. J. Williams, and E. J. Calvo, "Metal-ion responsive redox polyelectrolyte multilayers", *Chemical Communications* **46**, 9004 (2010).

58. J. Yáñez-Heras, G. A. Planes, F. Williams, C. A. Barbero, and F. Battaglini, "Sequential Electrochemical Polymerization of Aniline and Their Derivatives Showing Electrochemical Activity at Neutral pH", *Electroanalysis* **22**, 2801–2808 (2010).
57. A. Calvo, M. Joselevich, G. J. Soler-Illia, and F. J. Williams, "Chemical reactivity of amino-functionalized mesoporous silica thin films obtained by co-condensation and post-grafting routes", *Microporous and Mesoporous Materials* **121**, 67–72 (2009).
56. A. Calvo, B. Yameen, F. J. Williams, O. Azzaroni, and G. J. A. A. Soler-Illia, "Facile molecular design of hybrid functional assemblies with controllable transport properties: mesoporous films meet polyelectrolyte brushes", *Chemical Communications*, 2553 (2009).
55. A. Calvo, B. Yameen, F. J. Williams, G. J. Soler-Illia, and O. Azzaroni, "Mesoporous Films and Polymer Brushes Helping Each Other To Modulate Ionic Transport in Nanoconfined Environments. An Interesting Example of Synergism in Functional Hybrid Assemblies", *Journal of the American Chemical Society* **131**, 10866–10868 (2009).
54. M. Cardinal, P. Castro, J Baxi, H Liang, and F. Williams, "Characterization and frictional behavior of nanostructured Ni–W–MoS<sub>2</sub> composite coatings", *Surface and Coatings Technology* **204**, 85–90 (2009).
53. M. J. L. Gines, M. J. Loureiro, and F. J. Williams, "Effect of phosphorus on the hardness temperature resistance of nanostructured Ni–W electrodeposited coatings", *Plating and Surface Finishing* **96**, 30–35 (2009).
52. A Calvo, P. C. Angelomé, V. M. Sánchez, D. A. Scherlis, F. J. Williams, and G. J. A. A. Soler-Illia, "Mesoporous Aminopropyl-Functionalized Hybrid Thin Films with Modulable Surface and Environment-Responsive Behavior", *Chemistry of Materials* **20**, 4661–4668 (2008).
51. M. Joselevich and F. J. Williams, "Synthesis and Characterization of Diazonium Functionalized Nanoparticles for Deposition on Metal Surfaces", *Langmuir* **24**, 11711–11717 (2008).
50. M. Vago, M. Tagliacruzchi, F. J. Williams, and E. J. Calvo, "Electrodeposition of a palladium nanocatalyst by ion confinement in polyelectrolyte multilayers", *Chemical Communications*, 5746 (2008).
49. O. P. H. Vaughan, A. Alavi, F. J. Williams, and R. M. Lambert, "Dipole Amplification: A Principle for the Self-Assembly of Asymmetric Monomers on Metal Surfaces", *Angewandte Chemie International Edition* **47**, 2422–2426 (2008).
48. E. Völker, E. J. Calvo, and F. J. Williams, "Layer-by-Layer Self-Assembled Redox Polyelectrolytes on Passive Steel", *Israel Journal of Chemistry* **48**, 305–312 (2008).
47. M. J. L. Gines, F. J. Williams, and C. A. Schuh, "Nanostructured Cr–C coatings for application at high temperatures", *Journal of Applied Surface Finishing* **2**, 112–121 (2007).
46. M. Gines, F. Williams, and C. Schuh, "Strategy to Improve the High-Temperature Mechanical Properties of Cr-Alloy Coatings", *Metallurgical and Materials Transactions A* **38**, 1367–1370 (2007).
45. A. Orlov, D. J. Watson, F. J. Williams, M. Tikhov, and R. M. Lambert, "Interactions of 4-Chlorophenol with TiO<sub>2</sub> Polycrystalline Surfaces: A Study of Environmental Interfaces by NEXAFS, XPS, and UPS", *Langmuir* **23**, 9551–9554 (2007).
44. M. Tagliacruzchi, F. J. Williams, and E. J. Calvo, "Effect of Acid-Base Equilibria on the Donnan Potential of Layer-by-Layer Redox Polyelectrolyte Multilayers", *The Journal of Physical Chemistry B* **111**, 8105–8113 (2007).
43. M. Vago, F. J. Williams, and E. J. Calvo, "Enantioselective electrocatalytic hydrogenation of ethyl pyruvate on carbon supported Pd electrodes", *Electrochemistry Communications* **9**, 2725–2728 (2007).
42. M. E. Chiu, G. Kyriakou, F. J. Williams, D. J. Watson, M. S. Tikhov, and R. M. Lambert, "Sulfur, normally a poison, strongly promotes chemoselective catalytic hydrogenation: stereochemistry and reactivity of crotonaldehyde on clean and S-modified Cu(111)", *Chemical Communications*, 1283 (2006).

41. C Kolczewski, F. J. Williams, R. L. Cropley, O. P. H. Vaughan, A. J. Urquhart, M. S. Tikhov, R. M. Lambert, and K Hermann, "Adsorption geometry and core excitation spectra of three phenylpropene isomers on Cu(111)", *The Journal of Chemical Physics* **125**, 034701 (2006).
40. O. P. H. Vaughan, M. Turner, F. J. Williams, A. Hille, J. K. M. Sanders, and R. M. Lambert, "Direct Observation of Surface-Mediated Thioacetyl Deprotection: Covalent Tethering of a Thiol-Terminated Porphyrin to the Ag(100) Surface", *Journal of the American Chemical Society* **128**, 9578–9579 (2006).
39. O. P. H. Vaughan, F. J. Williams, N. Bampos, and R. M. Lambert, "A Chemically Switchable Molecular Pinwheel", *Angewandte Chemie International Edition* **45**, 3779–3781 (2006).
38. R. L. Cropley, F. J. Williams, A. J. Urquhart, O. P. H. Vaughan, M. S. Tikhov, and R. M. Lambert, "Efficient Epoxidation of a Terminal Alkene Containing Allylic Hydrogen Atoms: trans-Methylstyrene on Cu(111)", *Journal of the American Chemical Society* **127**, 6069–6076 (2005).
37. R. L. Cropley, F. J. Williams, O. P. Vaughan, A. J. Urquhart, M. S. Tikhov, and R. M. Lambert, "Copper is highly effective for the epoxidation of a difficult alkene, whereas silver is not", *Surface Science* **578**, L85–L88 (2005).
36. G. Kyriakou, F. J. Williams, M. S. Tikhov, A. Wander, and R. M. Lambert, "Structure and dynamics of gold atomic chains grown on Cu(110): Experiment and theory", *Physical Review B* **72**, 121408 (2005).
35. R. M. Lambert, F. J. Williams, R. L. Cropley, and A. Palermo, "Heterogeneous alkene epoxidation: past, present and future", *Journal of Molecular Catalysis A: Chemical* **228**, 27–33 (2005).
34. N. MacLeod, F. J. Williams, M. S. Tikhov, and R. M. Lambert, "An Electrochemically Driven and Electrochemically Regenerated NO<sub>x</sub> Trap", *Angewandte Chemie International Edition* **44**, 3730–3732 (2005).
33. A. J. Urquhart, F. J. Williams, and R. M. Lambert, "Electrochemical Promotion by Potassium of Rh-Catalysed Fischer-Tropsch Synthesis at High Pressure", *Catalysis Letters* **103**, 137–141 (2005).
32. A. J. Urquhart, F. J. Williams, O. P. H. Vaughan, R. L. Cropley, and R. M. Lambert, "Adsorbate conformation determines catalytic chemoselectivity: crotonaldehyde on the Pt(111) surface", *Chemical Communications*, 1977 (2005).
31. F. J. Williams, R. L. Cropley, O. P. H. Vaughan, A. J. Urquhart, M. S. Tikhov, C. Kolczewski, K. Hermann, and R. M. Lambert, "Critical Influence of Adsorption Geometry in the Heterogeneous Epoxidation of Allylic Alkenes: Structure and Reactivity of Three Phenylpropene Isomers on Cu(111)", *Journal of the American Chemical Society* **127**, 17007–17011 (2005).
30. F. J. Williams, D. P. C. Bird, A. Palermo, A. K. Santra, and R. M. Lambert, "Mechanism, Selectivity Promotion, and New Ultrasensitive Pathways in Ag-Catalyzed Heterogeneous Epoxidation", *Journal of the American Chemical Society* **126**, 8509–8514 (2004).
29. F. J. Williams, O. P. H. Vaughan, K. J. Knox, N. Bampos, and R. M. Lambert, "First observation of capping/uncapping by a ligand of a Zn porphyrin adsorbed on Ag(100)", *Chemical Communications* **10**, 1688 (2004).
28. J. M. Bonello, F. J. Williams, and R. M. Lambert, "Aspects of Enantioselective Heterogeneous Catalysis: Structure and Reactivity of (S)-(–)-1-(1-Naphthyl)ethylamine on Pt(111)", *Journal of the American Chemical Society* **125**, 2723–2729 (2003).
27. A. J. Urquhart, J. M. Keel, F. J. Williams, and R. M. Lambert, "Electrochemical Promotion by Potassium of Rhodium-Catalyzed Fischer-Tropsch Synthesis: XP Spectroscopy and Reaction Studies", *The Journal of Physical Chemistry B* **107**, 10591–10597 (2003).
26. F. J. Williams, D. P. C. Bird, E. C. H. Sykes, A. K. Santra, and R. M. Lambert, "Molecular Conformation of Styrene on Ag(100): Relevance to an Understanding of the Catalytic Epoxidation of Terminal Alkenes", *The Journal of Physical Chemistry B* **107**, 3824–3828 (2003).

25. F. J. Williams, N. Malikova, and R. M. Lambert, "An AFM Study of the Genesis and Sintering in Hydrogen of a Realistic Cu/Amorphous Silica Planar Model Catalyst", *Catalysis Letters* **90**, 177–180 (2003).
24. A. Palermo, F. J. Williams, and R. M. Lambert, "In Situ Control of the Composition and Performance of a Bimetallic Alloy Catalyst: The Selective Hydrogenation of Acetylene over Pt/Pb", *The Journal of Physical Chemistry B* **106**, 10215–10219 (2002).
23. E. C. H. Sykes, F. J. Williams, M. S. Tikhov, and R. M. Lambert, "Nucleation, Growth, Sintering, Mobility, and Adsorption Properties of Small Gold Particles on Polycrystalline Titania", *The Journal of Physical Chemistry B* **106**, 5390–5394 (2002).
22. F. J. Williams, A. Palermo, J. P. Holgado, and R. M. Lambert, "First Demonstration of in Situ Electrochemical Control of the Composition and Performance of an Alloy Catalyst during Reaction", *Journal of Catalysis* **210**, 237–240 (2002).
21. F. J. Williams, N. Macleod, M. S. Tikhov, and R. M. Lambert, "Electrochemical promotion of bimetallic Rh–Ag/YSZ catalysts for the reduction of NO under lean burn conditions", *Electrochimica Acta* **47**, 1259–1265 (2002).
20. F. J. Williams, A. Palermo, S. Tracey, M. S. Tikhov, and R. M. Lambert, "Electrochemical Promotion by Potassium of the Selective Hydrogenation of Acetylene on Platinum: Reaction Studies and XP Spectroscopy", *The Journal of Physical Chemistry B* **106**, 5668–5672 (2002).
19. J. Bonello, E. Sykes, R. Lindsay, F. Williams, A. Santra, and R. Lambert, "Fundamental aspects of enantioselective heterogeneous catalysis: a NEXAFS study of methyl pyruvate and (S)-naphthyl ethylamine on Pt(111)", *Surface Science* **482–485**, 207–214 (2001).
18. A. K. Santra, D. P. C. Bird, E. C. H. Sykes, F. J. Williams, A. Goldoni, A. Baraldi, and R. M. Lambert, "The Chemistry of Sulfoxy Species on Clean, Oxygenated, and Caesiated Ag(100): A Study of Surface Reactivity by Fast XPS and TPR", *The Journal of Physical Chemistry B* **105**, 10062–10068 (2001).
17. F. J. Williams, A. Palermo, M. S. Tikhov, and R. M. Lambert, "Electrochemical Promotion by Sodium of the Rhodium–Catalyzed Reduction of NO by Propene: Kinetics and Spectroscopy", *The Journal of Physical Chemistry B* **105**, 1381–1388 (2001).
16. F. J. Williams, A. Palermo, M. S. Tikhov, and R. M. Lambert, "Mechanism of alkali promotion in heterogeneous catalysis under realistic conditions: application of electron spectroscopy and electrochemical promotion to the reduction of NO by CO and by propene over rhodium", *Surface Science* **482–485**, 177–182 (2001).
15. F. J. Williams, M. S. Tikhov, A. Palermo, N. Macleod, and R. M. Lambert, "Electrochemical Promotion of Rhodium–Catalyzed NO Reduction by CO and by Propene in the Presence of Oxygen", *The Journal of Physical Chemistry B* **105**, 2800–2808 (2001).
14. J. M. Bonello, F. J. Williams, A. K. Santra, and R. M. Lambert, "Fundamental aspects of enantioselective heterogeneous catalysis: The surface chemistry of methyl pyruvate on Pt(111)", *Journal of Physical Chemistry B* **104**, 9696–9703 (2000).
13. R. M. Lambert, A. Palermo, F. J. Williams, and M. S. Tikhov, "Electrochemical promotion of catalytic reactions using alkali ion conductors", *Solid State Ionics* **136–137**, 677–685 (2000).
12. R. M. Lambert, F. Williams, A. Palermo, and M. S. Tikhov, "Modelling alkali promotion in heterogeneous catalysis: In situ electrochemical control of catalytic reactions", *Topics in Catalysis* **13**, 91–98 (2000).
11. F. J. Williams and R. M. Lambert, "A study of sodium promotion in Fischer–Tropsch synthesis: Electrochemical control of a ruthenium model catalyst", *Catalysis Letters* **70**, 9–14 (2000).
10. F. J. Williams, A. Palermo, M. S. Tikhov, and R. M. Lambert, "Electrochemical Promotion by Sodium of the Rhodium–Catalyzed NO+CO Reaction", *The Journal of Physical Chemistry B* **104**, 11883–11890 (2000).



9. F. J. Williams, A. Palermo, M. S. Tikhov, and R. M. Lambert, "The Origin of Electrochemical Promotion in Heterogeneous Catalysis: Photoelectron Spectroscopy of Solid State Electrochemical Cells", *The Journal of Physical Chemistry B* **104**, 615–621 (2000).
8. D. A. Mirabella, F. J. Williams, and C. M. Aldao, "Monte Carlo modeling for roughening of Si(100) steps during homoepitaxial growth", *Physical Review B* **59**, 9850–9853 (1999).
7. F. J. Williams, A. Palermo, M. S. Tikhov, and R. M. Lambert, "First Demonstration of in Situ Electrochemical Control of a Base Metal Catalyst: Spectroscopic and Kinetic Study of the CO+NO Reaction over Na–Promoted Cu", *The Journal of Physical Chemistry B* **103**, 9960–9966 (1999).
6. F. Williams and C. Aldao, "On the origin of metal film work function changes under electrochemical modification", *Surface Science* **425**, L387–L392 (1999).
5. F. J. Williams, C. M. Aldao, A. Palermo, and R. M. Lambert, "A Monte Carlo simulation of the NO+CO reaction on Na–promoted platinum", *Surface Science* **412–413**, 174–183 (1998).
4. F. J. Williams, C. M. Aldao, Y Gong, and J. H. Weaver, "Why Si(100) steps are rougher after etching", *Physical Review B* **55**, 13829–13834 (1997).
3. F. J. Williams, J. R. Sánchez, and C. M. Aldao, "Reply to Comment on Step dynamics and equilibrium structure of monoatomic steps on Si(100)–2x1", *Physical Review B* **56**, 15471–15473 (1997).
2. F. Williams, J. Sánchez, and C. Aldao, "Monte Carlo simulations of monatomic steps dynamics on Si(100)–(2x1)", *Surface Science* **391**, 260–266 (1997).
1. F. J. Williams, C. M. Aldao, and J. H. Weaver, "Surface morphologies for Br–etched Si(100)–2x1: Kinetics of pit growth and step retreat", *Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures* **14**, 2519 (1996).

### Patents

3. US Patent US 8236422 B2, European Patent Application 08170849.7, Diazonium functionalized nanoparticles and methods for binding nanoparticles to metallic surfaces, María Joselevich and Federico J. Williams, 7 August 2012. Company: Tenaris Connections AG.
2. US Patent US 8257572 B2, European Patent Application 2268854A0, Solicitud Patente Argentina 071101 A1, Method for electrochemical plating and marking of metals, Pablo Castro and Federico J. Williams, 4 September 2012. Company: Tenaris Connections AG.
1. US Patent US 8771494 B2, Synthesis of oil containing microcapsules and their use in functional composite coatings, María José Churruca, Pablo Castro and Federico J. Williams, 8 July 2014. Company: Tenaris Connections AG.

### Conference Invited Talks

12. Attachment of porphyrin molecules to self-assembled monolayers and oxide surfaces, 2nd funCOS International Workshop, Erlangen, Germany, 17-19 November 2019.
11. Lithium for the sustainable intermittent renewable energy storage, Exploring the Frontiers of Chemistry, Chemistry Symposium Universidad de Buenos Aires-Ben Gurion University, Buenos Aires, Argentina, 9-10 September 2019.
10. Chemistry of Materials, Energy and the Environment for a sustainable world: Li recovery from Natural Brine, 1st China Latin America Forum of Technology and Innovation, Rio de Janeiro, Brasil, 29-30 August 2016.
9. Using layer-by-layer self-assembly to functionalize surfaces with nano-objects, funCOS International Workshop, Erlangen, Germany, 8-10 November 2015.
8. Reducción electroquímica de CO<sub>2</sub> utilizando nanoaleaciones de Au-Cu, XIV Encuentro de Superficies y Materiales Nanoestructurados, San Carlos de Bariloche, Argentina, 14-16 de Mayo de 2014 .

7. Electroreducción de CO<sub>2</sub>, XVIII Congreso Argentino de Fisicoquímica y Química Inorgánica, Rosario, Argentina, 9-12 Abril 2013.
6. Estudios de autoensamblados moleculares sobre superficies metálicas, XII Encuentro de Superficies y Materiales Nanoestructurados, Córdoba, Argentina, 2012.
5. Estudios de autoensamblados moleculares: generación de sitios catalíticos, fluorescentes y redox, V Encuentro de Física y Química de Superficies, Rosario, Argentina, 27-29 Octubre 2011.
4. Endowing new properties to surfaces, Boston, USA, Fall Meeting American Chemical Society, 22-26 Agosto 2010.
3. Nanocatalizadores de Pd para la hidrogenación enantioselectiva de moléculas proquirales, X Encuentro de Superficies y Materiales Nanoestructurados, San Carlos de Bariloche, Argentina, 2010.
2. Electrodeposición de nanocatalizadores de Pd mediante el confinamiento de iones y su uso en la hidrogenación enantioselectiva de moléculas proquirales, Buenos Aires, Argentina, XVI Congreso Argentino de Catálisis, 3-7 Agosto 2009.
1. Critical influence of adsorption geometry in the heterogeneous epoxidation of allylic alkenes, II Encuentro de Física y Química de Superficies, Vaquerías, Córdoba, Argentina, 18-20 Mayo 2006.

### Doctoral Theses Supervised

2023– Fundamental studies on surfaces and interfaces of quantum materials, Joaquín Gajst, (dirección conjunta con Laura Steren), Universidad de Buenos Aires.

2020– Electronic Structure of TiO<sub>2</sub>(110) surfaces modified with Ruthenium polypyridines, Luciano Sanchez Merlinsky, (joint supervision with Luis Baraldo), Universidad de Buenos Aires.

2017–2020. Electrocatalytic reactions relevant to the storage and conversion of energy, Federico Davia, (joint supervision with Ernesto J. Calvo), Universidad de Buenos Aires.

2016–2020. Chemical reactivity of porphyrin molecules adsorbed to solid surfaces, Cynthia Fernandez, Universidad de Buenos Aires.

2013–2018. Electrochemical device to recover Li from natural brine, Florencia Marchini, (joint supervision with Ernesto J. Calvo), Universidad de Buenos Aires.

2007–2013. Modified electrodes and their uses in electrocatalysis, Edgar Völker, (joint supervision with David J. Schiffrin), Universidad de Buenos Aires.

2007–2010. Nanoporous films containing organic functions: surfaces with tunable chemistry, Alejandra Calvo (joint supervision with Galo Soler-Illia), Universidad Nacional de San Martín.

### Postdoctoral Researchers Supervised

2019–2020. Dr. Bruno Aramburu.

2012–2014. Dr. Ezequiel de la Llave.

2010–2011. Dra. Alejandra Ricci.