CURRICULUM VITAE

Esteban Alejandro Araya Hermosilla
PhD, Chemistry and Materials Science
Marine Biologist / Scientific Diver
E-mail: esteban.araya@iit.it
Nationality: Chilean
Marital status: Married

Professional profile

Enthusiastic scientist able to design and deliver teaching materials and student assessment activities. Excellent skills organizing collaborative research activities to engage relevant professional and knowledge exchange. Ability to attract research funding by formulating innovative ideas in collaboration with outstanding national and international scientists. Ten years of experience carrying out research and thesis supervision assigned by the head of the department Chemical Product Technology, Dr. professor Francesco Picchioni (University of Groningen, the Netherlands), the head of the smart materials group Dr. Virgilio Mattoli(Center of Smart Interfaces, Istituto Italiano di Tecnologia, Italy), and the head of Smart Polymers Group, Dr. professor Andrea Pucci (University of Pisa).

Education

2013-2017 **PhD, Chemistry and Materials Science**, Faculty of Science and Engineering (FSE), Engineering and Technology institute Groningen (ENTEG), Department of Chemical Product Technology, University of Groningen, the Netherlands.

2008-2009 **Scientific Diving**, Deutsche Gesetzliche Unfallversicherung (DGUV), Germany, Instituto de Biología Marina, Universidad Austral de Chile, Valdivia, Chile.

2005-2012 **Bachelor degree in Marine Biology,** Universidad Austral de Chile, Valdivia, Chile.

Professional experience

2018-UTD **PostDoc**, "Material development for bioinspired soft-actuators and chemical sensors". Center for Micro-BioRobotics @SSSA, Istituto Italiano di Tecnologia, Pontedera (PI). Italy. **Competences**: project management, laboratory set-up, problem solving, team working, adaptability, publication of results.

2017 **PostDoc, "**Novel chemical methods for the oxidation of potato starch. Department of Chemical Engineering, ENTEG, University of Groningen, The Netherlands" **Competences**: project management, laboratory set-up, problem solving, team working, adaptability.

2012-2013 **Research Assistant**, "Project CONICYT N°: 1120514". "Materials based on nanoparticles containing active low molecular weight molecules". Laboratorio de Polímeros, Facultad de Ciencias, Universidad Austral de Chile, Valdivia-Chile. **Competences**: laboratory set-up, problem solving, team working, papers publication.

2013-2017 PhD, Dissertation project: "Polymeric surfactants based on the chemical modification of alternating aliphatic polyketones". Department of Chemical Product Technology, ENTEG, University of Groningen, the Netherlands. **Competences**: proposal formulation, founding achievement, project management, laboratory set-up, problem solving, team working, adaptability, thesis supervision, book and papers publication.

2009-2010 Bachelor thesis. "Encapsulation of a low molecular molecule in microcapsules of calcium alginate. "Fondecyt Regular - 2009 – 1090341, Innova Corfo número 07CN13PPT256". Laboratorio de Polímeros, Facultad de Ciencias, Universidad Austral de Chile, Valdivia-Chile. **Competences**: project formulation, laboratory set-up, team working, papers publication.

2009 Scientific diver. "Ecological impact of organic contamination in Queule river". Instituto de Ecología y Evolución, Universidad Austral de Chile, Valdivia-Chile. **Competences:** problem solving, team working.

2010 Internship. "Structure communities study in the intertidal zone of Puerto Montt". Laboratorio de Calfuco, Facultad de Ciencias, Instituto de Biología Marina, Universidad Austral de Chile, Valdivia, Chile. **Competences:** team working, report of activities and results.

2008 Internship. "Sensing Cu2+ by controlling the aggregation properties of the fluorescent dye rhodamine 6G with the aid of polyelectrolytes bearing different linear aromatic density". Laboratorio de Polímeros, Facultad de Ciencias, Universidad Austral de Chile, Valdivia-Chile. **Competences:** team working, report of activities and results.

Thesis supervision

Thesis supervision of master students of Chemical Engineering. University of Groningen, the Netherlands.

2022 Laura Pecchia (M.Sc, candidate). Dissertation project: "Polymeric nanocomposites based on polyketone and reduce graphene oxide".

2017 Paulien Beek (M.Sc, candidate). Dissertation project: "Chemical modification of alternating aliphatic polyketones in continuous micro-reactors".

2017 Marnix Roscam (M.Sc, candidate). Dissertation project: "Amphiphilic modified polyketones as nanocarriers of 5,10,15,20-tetrakis-(4-sulfonatophenyl)porphyrin for the photocatalytic oxidation of encapsulated 1,3,5-triphenylformazan in poly(sodium 4-styrenesulfonate)".

2016 Bi Su (M.Sc, candidate). Dissertation project: "Synthesis of polymer surfactants by chemical modification of alternating aliphatic polyketones".

Grants and Fellowships

2013 PhD Fellowship (72130047), Becas Chile, CONICYT, Chile.

Research expertise

- Polymeric surfactants synthesis and characterization
- Self-healing thermoset polymers and nanocomposites
- Polymeric nanocomposite synthesis and characterization
- Micro and nano-encapsulation for controlled drug delivery
- Polymer characterization
- Optical sensors design
- Chemical modification of Polyolefins
- Chemical modification of carbonaceous nanofillers
- Spectrometric/scattering characterization of polymers and nanostructures
- Thermo-mechanical processing / characterization of synthetic polymers

Languages: Spanish (native), English (C1), Italian (B2).

Computer operative systems and programs: Windows, Microsoft Office, Origin, MestReNova, ChemDraw.

Hobbies: Dancing, diving, football, trekking, bodyboarding, climing.

List of Publications

1- **Esteban Araya-Hermosilla**, Paola Parlanti, Mauro Gemmi, Virgilio Mattoli, Sebastiano Di Pietro, Dalila Iacopini, Carlotta Granchi, Barbara Turchi, Filippo Fratini, Valeria Di Bussolo, Filippo Minutolo, Francesco Picchioni and Andrea Pucci Functionalized aliphatic polyketones with germicide activity. RSC Adv., 2022, 12, 35358

2- Orozco, F., Salvatore A., Sakulmankongsuk, A., Ribas Gomes., D., Pei., Y., **Araya-Hermosilla E**., Pucci, A., Moreno-Villoslada I., Picchioni F., K Bose R., Electroactive performance and cost evaluation of carbon nanotubes and carbon black as conductive fillers in self-healing shape memory polymers and other composites. Polymer, 2022, 260,125365,

3- **Araya-Hermosilla, E**., Araya-Hermosilla, R., Visentin, F., Picchioni, F., Pucci A., Mattoli, V. Nitrogen Dioxide Optical Sensor Based on Redox-Active Tetrazolium/Pluronic Nanoparticles Embedded in PDMS Membranes. Chemosensors 2022, 10(6), 213.

4- **Araya-Hermosilla, E**., Gabbani, A., Mazzotta, A., Ruggeri, M., Orozco, F., Cappello, V., Gemmi, M., K Bose, R., Picchioni, F., Pineider, F., Mattoli, V & Pucci A. Rapid Self-Healing in IR-Responsive Plasmonic Indium Tin Oxide/Polyketone Nanocomposites. J. Mater. Chem. A, 2022,10, 12957-12967.

5- Migliore, N., **Araya-Hermosilla, E**., Scheutz, G. M., Sumerlin, B. S., Pucci, A., & Raffa, P. (2022). Synthesis of poly(1-vinylimidazole)-block-poly(9-vinylcarbazole) copolymers via RAFT and their use in chemically responsive graphitic composites. Journal of Polymer Science, 60(4).

6- Ferretti, A., Sinha, S., Sagresti, L., **Araya-Hermosilla, E**., Prato, M., Mattoli, V., Pucci, A., & Brancato, G. (2022). One-step functionalization of mildly and strongly reduced graphene oxide with maleimide: an experimental and theoretical investigation of the Diels–Alder [4+2] cycloaddition reaction. Physical Chemistry Chemical Physics, 24(4), 2491–2503.

7- Cangiotti, J., Scatto, M., **Araya-Hermosilla, E**., Micheletti, C., Crivellari, D., Balloni, A., Pucci, A., & Benedetti, A. (2022). Valorization of seashell waste in polypropylene composites: An accessible solution to overcome marine landfilling. European Polymer Journal, 162, 110877.

8- **Araya-Hermosilla, E.**, Giannetti, A., Lima, G. M. R., Orozco, F., Picchioni, F., Mattoli, V., Bose, R. K., & Pucci, A. (2021). Thermally Switchable Electrically Conductive Thermoset rGO/PK Self-Healing Composites. Polymers, 13(3), 339.

9- Esteban Araya-Hermosilla, Marco Carlotti, Francesco Picchioni, Virgilio Mattoli, Andrea Pucci. Electrically-Conductive Polyketone Nanocomposites Based on Reduced Graphene Oxide (2020). Polymers, 12(4), 923.

10- Esteban Araya-Hermosilla, Matteo Minichino, Virgilio Mattoli, Andrea Pucci. Chemical and Temperature Sensors Based on Functionalized Reduced Graphene Oxide (2020). Chemosensors, 8, 43.

11- Esteban Araya-Hermosilla, Ignacio Moreno-Villoslada, Rodrigo Araya-Hermosilla, Mario E. Flores, Patrizio Raffa, Tarita Biver, Andrea Pucci, Francesco Picchioni, Virgilio Mattoli. pH-Responsive Polyketone/5,10,15,20-Tetrakis-(Sulfonatophenyl)Porphyrin Supramolecular Submicron Colloidal Structures (2020). Polymers, 12(9), 2017.

12- Pablo Gonzalez Cortesa, RodrigoAraya-Hermosilla, EstebanAraya-Hermosilla, Daniela Acuña, Andreas Mautner, Leonardo Caballero, Francisco Melo, Ignacio Moreno-Villoslada, Francesco Picchioni, Aldo Rolleri, Franck Quero. Mechanical properties and electrical surface charges of microfibrillated cellulose/imidazole-modified polyketone composite membranes (2020). Polymer Testing, 89, 106710.

13- Esteban Araya-Hermosilla, Marnix Roscam-Abbing, José Catalán-Toledo, Francesco Picchioni, Felipe Oyarzún, Moreno-Villoslada Ignacio. Synthesis of Tuneable Amphiphilic-Modified Polyketone Polymers, their Complexes with 5,10,15,20-Tetrakis-(4-Sulfonatophenyl)porphyrin, and their Role in the Photooxidation of 1,3,5-Triphenylformazan Confined in Polymeric Nanoparticles (2019). Polymer, 167, 215-223.

14- Esteban Araya-Hermosilla, José Catalán-Toledo, Fabián Muñoz-Suescun, Felipe Oyarzun-Ampuero, Patrizio Raffa, Lorenzo Massimo Polgar, Francesco Picchioni, Ignacio Moreno-Villoslada. Totally organic redox-Active pH-sensitive nanoparticles stabilized by amphiphilic aromatic polyketones (2018). J. Phys. Chem. B 122, 1747−1755.

15- R. Araya-Hermosilla, A. Pucci, E. Araya-Hermosilla, P. P. Pescarmona, P. Raffa, L. M. Polgar, I. Moreno-Villoslada, M. Flores, G. Fortunato, A. A. Broekhuis and F. Picchioni. An easy synthetic way to exfoliate and stabilize MWCNTs in a thermoplastic pyrrole-containing matrix assisted by hydrogen bonds (2016). RSC Advances, 6, 85829-85837.

16- Esteban Araya-Hermosilla, Sandra orellana, Claudio Toncelli, Francesco Picchioni, Ignacio Moreno-Villoslada. Novel polyketones with pendant imidazolium groups as nanodispersants of hydrophobic antibiotics (2015). Journal of Applied Polymer Science, 132, 42363.

17- Esteban Araya-Hermosilla, Daniel Munoz, Sandra Orellana, Lejandro Yanez, Andres F. Olea, Felipe Ayarzun-Ampuero, Alejandro Yañez, Ignacio Moreno-Villoslada. Immobilization of rhodamine 6G in calcium alginate microcapsules base on aromatic-aromatic interactions with poly(sodium 4-styrenesulfonate) (2014). Reactive & Functional Polymers 81, 14-21.

18- R. Araya-Hermosilla, E. Araya-Hermosilla, C. Torres-Gallegos, C. Alarcón-Alarcón, Hiroyuki Nishide, I. Moreno-Villoslada. Sensing Cu2+ by controlling the aggregation properties of the fluorescent dye rhodamine 6G with the aid of polyelectrolytes bearing different linear aromatic density (2013). Reactive and Functional Polymers, 73, 11, 1455-1463.

Contribution to international conferences

Oral presentations:

1. **Araya-Hermosilla, E**., Araya-Hermosilla, R., Visentin, F., Picchioni, F., Pucci A., Mattoli, V. **(June 25-29, 2022) Nitrogen Dioxide Optical Sensor Based on Redox-Active Tetrazolium/Pluronic Nanoparticles Embedded in PDMS Membranes**. 9th Forum on New Materials of CIMTEC 2022. Oral presentation

2. Ignacio Moreno-Villoslada, José Catalán-Toledo, Mario E. Flores, Rodrigo Araya-Hermosilla, César Torres-Gallegos, **Esteban Araya-Hermosilla**, Felipe Orozco, Ariel Nenen, María Alejandra Coronel, Toshimichi Shibue, Gabriel A. Vallejos, Francesco Piccioni, José Roberto Vega-Baudrit, Thomas Hoffmann, Judit G. Lisoni, Felipe Oyarzun-Ampuero, Hiroyuki Nishide **(20-23 Agosto 2018)**. **Aromatic-aromatic interactions between aromatic polyelectrolytes and low-molecular weight aromatic counterions as a tool for tuning materials properties and functionalities.** European Advanced Materiales Conference (EAMC), Stockholm, Sweden. Oral presentation.

3. **Esteban Araya-Hermosilla**, Patrizio Raffa, Ignacio Moreno-Villoslada, Francesco Picchioni **(4-9 Decembre 2016). Formazan nanoprecipitates controlled by the use of a polyanion derived from polyketone**. American Advanced Materials Congress. Miami, USA. Oral presentation.

4. **Esteban Araya-Hermosilla**, Patrizio Raffa, Ignacio Moreno-Villoslada, Francesco Picchioni **(23-27 October 2016). pH-responsive polymers based on the chemical modification of polyketones**. XV Simposio Latinoamericano de Polimeros, XIII Congreso Iberoamericano de Polimeros. Cancun-Rivera Maya, Mexico. Oral presentation.

5. **E. Araya-Hermosilla**, S. Orellana, F. Oyarzun-Ampuero, H. Silva, A. Yañez, I. Moreno-Villoslada. **(25-28, October, 2011). A Novel Labeling Way of Micrapsules Calcium Alginate with Rhodamine 6G**. Internacional Conference on Materials Science for Nanotechnology, Catálisis and Biomedicina. Valdivia, Chile. Oral presentation.

6. R. Araya-Hermosilla, C. Alarcón, **E. Araya-Hermosilla**, M. Flores, I. Moreno-Villoslada. **(26 June - 1 July 2011). Photochromic reaction of fluorescent rhodamine 6G-polyelectrolyte complexes and the sensitivity of the complexes to Mercury in solution**. (European Polymer Congress EPF2011, and XII Congress of the Specialized Group of Polymers GEP. Granada, Spain. Oral presentation.

7. I. Moreno-Villoslada, J. P. Fuenzalida-Werner, R. Araya-Hermosilla, **E. Araya-Hermosilla**, C Torres-Gallegos, j Gómez-Manosalba, D. Muños, V. Barrueto, M. Flores, N. Sano, W. Tomita, F. Oyarzun-Ampuero, H. Nishide. **(26 June - 1 July 2011). Characterization and**

Applications of Aromatic-Aromatic Interactions between Water-Soluble Polymer and Low Molecular-Weight Molecules. European Polymer Congress EPF2011, and XII Congress of the Specialized Group of Polymers GEP. Granada, Spain. Oral presentation.

8. R. Araya-Hermosilla, **E. Araya-Hermosilla**, C. Torres-Gallegos, S. Mulsow-Flores, I. Moreno-Villoslada **(2009). Fluorescence change of rhodamine 6G-water-soluble polymers complex in the presence of Cu2+ in solution**. 13th IUPAC International Symposium on MacroMolecular Complexes (MMC-13), Chile. Oral presentation.

Poster presentations:

1. Ottavia Racchi, Rebecca Baldassari, **Esteban Araya-Hermosilla**, Andrea Pucci,1, Alfonso Pozio (**December 2021**). Polyketone-based anion exchange membranes for alkaline water electrolyzer (AME). European Fuel Cells and Hydrogen Conference EFC2. Virtual conference. **Poster**.

2. **Esteban Araya-Hermosilla,** Patrizio Raffa, Francesco Picchioni, Andrea Pucci, Virgilio Mattoli (**3- 5 July 2019**). **pH-responsive polymeric surfactants based on the chemical modification of polyketones**. CFF 2019 - Chemistry for the Future International Conference. Pisa. Italy. **Poster**.

3. **Esteban Araya-Hermosilla,** Patrizio Raffa, Ignacio Moreno-Villoslada, Francesco Picchioni (**30 August - 2 September 2015**). **Polymeric surfactants based on the chemical modification of polyketones**. International Symposium on Amphiphilic Polymers, Networks, Gels and Membranes. Budapest, Hungary. **Poster**.

4. **Esteban Araya-Hermosilla**, Sandra Orellana, Felipe Oyarzun-Ampuero, Daniel Muñoz-Pichuante, Ignacio Moreno-Villoslada. (**5-8 December of 2012**). **Encapsulation of low Molecular Weight Hydrophilic Molecules in Calcium Alginate Beads.** Coloquio de Macromoléculas CM-6, Termas de Catillo, Catillo, Parral, Chile. **Poster**.

5. **Esteban Araya-Hermosilla**, Ignacio Moreno-Villoslada, Sandra Orellana, Cesar-Gallegos, Gustavo Peréz, Alexis Morales, Hugo Silva, Alejandro Yañez. (**26 June - 1 July 2011**). **Fluorescent Labeling of Calcium Alginate Vedas with Rhodamine 6G Assisted by Polyaromatic-Anion**. European Polymer Congress EPF2011, and XII Congress of the Specialized Group of Polymers GEP. Granada, Spain. **Poster**.

6. **Esteban Araya-Hermosilla**, Ignacio Moreno-Villoslada, Sandra Orellana, Cesar-Gallegos, Gustavo Peréz, Alexis Morales, Hugo Silva, Alejandro Yañez. (**1-3 Decembre 2010**). **Nanoencapsulation and Microencapsulation of Antigens with Orals Immunizing Vaccines for Salmons.** Coloquio de macromoléculas, Termas de Catillo, Parral, Chile. **Poster**.

7. Gustavo Pérez-Bustamante, Ignacio Moreno-Villoslada, Sandra Orellana, César Torres-Gallegos, **Esteban Araya-Hermosilla**, Alejandro Yánez. (**1-3 Diciembre 2010**). **Microencapsulation of Oxitetracycline in Functional Food for Salmons**. Coloquio de macromoléculas, Termas de Catillo, Parral, Chile. **Poster**.

8. R. Araya-Hermosilla, I. Moreno-Villoslada, **E. Araya-Hermosilla**, C. Torres-Gallegos, E. Fuentes-Gutiérrez, S. Orellana-Donoso, S. Mulsow-Flores (**2009**). **Luminescence changes of rhodamine 6G/water-soluble polymer complexes in the presence of Cu2+ in solution.** Gordon Research Conferences, Boston, United States. **Poster**.

9. C. Torres-Gallegos, R. Araya-Hermosilla, E. Fuentes-Gutiérrez, **E. Araya-Hermosilla**, S. Orellana, I. Moreno-Villoslada (**2009**). **Intelligent materials based on the formation of nanoparticles sensitive to metal ions**. 1er National Congress of Nanotechnology, Valparaíso, Chile. **Poster**.