

Dr. ANA INÉS TORRES RIPPA

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EDUCATION

Postdoctoral Training, Chemical Engineering <i>Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, U.S.A.</i>	2014
Ph.D., Chemical Engineering <i>University of Minnesota- Twin Cities, Minneapolis, Minnesota, U.S.A.</i>	2013
Chemical Engineer <i>Universidad de la República Oriental del Uruguay, Montevideo, Uruguay</i>	2005
BSc. Chemistry <i>Universidad de la República Oriental del Uruguay, Montevideo, Uruguay</i>	2003

PROFESSIONAL APPOINTMENTS

Assistant Professor <i>Department of Chemical Engineering Carnegie Mellon University, Pittsburgh, PA, USA</i>	2022- Present
Profesor Agregado G^o4-DT (Effective) <i>Department of Chemical Engineering Universidad de la República, Montevideo, Uruguay</i>	2021- 2022
Profesor Adjunto G^o3-DT (Effective) <i>Department of Chemical Engineering Universidad de la República, Montevideo, Uruguay</i>	2017- 2021
Profesor Adjunto G^o3 <i>Department of Chemical Engineering Universidad de la República, Montevideo, Uruguay</i>	2015- 2016
Research and Development Engineer <i>Fanacif S.A. (Affinia Group Inc.), Montevideo, Uruguay</i>	2005 - 2006

TEACHING EXPERIENCE

Department of Chemical Engineering, Carnegie Mellon University
Graduate: Chemical and Reactive Systems (Instructor, Fall 2022), PSE Seminar (Instructor, Fall 2022, Spring 2023, Fall 2023)
Undergraduate: Mathematical Methods of Chemical Engineering (Instructor, Spring 2023), Chemical Process Systems Design (Instructor, Fall 2023)

School of Engineering, Institute of Chemical Engineering, UdelaR, Uruguay

Undergraduate: Modeling Simulation and Optimization of Chemical Processes/ Process Design and Optimization of Chemical Processes (Professor in charge Fall 2015-2017, Spring 2019-2020), Fluid dynamics (Lecturer, Fall 2018-2019),

Department of Chemical Engineering and Materials Science, University of Minnesota

Teaching Assistant: Graduate Applied Mathematics (Fall 2011), undergraduate Process Design (Fall 2009), undergraduate Mass Transfer and Separation Processes (Spring 2008). Chemical Rate Processes. Delivered lecture on “Introduction to non-linear parameter estimation ” (Spring 2012).

School of Chemistry, UdelaR, Uruguay

Lab Assistant: Undergraduate Physical Chemistry II (Fall 2001, Fall 2002), undergraduate Electrochemistry (Spring 2002, Spring 2003).

HONORS/AWARDS/RECOGNITIONS/ INVITED TALKS

- Invited Talk: Department of Engineering and Public Policy, Carnegie Mellon University 2023
“ Storage and Conversion of intermittent renewable energy: Uruguay as a case study ”
- Invited Talk: Departamento de Ingeniería Química, Universidad de Guanajuato 2023
“Almacenamiento y Conversión de Energía Renovable: Hacia economías cero carbono neto ”
- Invited Talk: FOCAPO/ CPC Conference 2023
“Circular Economy: Definitions, Challenges, and Opportunities”- with S. Avraamidou.
- Invited Talk: Department of Chemical Engineering- University of Kansas 2022
“Process Systems Engineering for transitioning to low carbon economies”.
- Invited Talk: 4th Computer Engineering Forum, College of Engineering University of Wisconsin-Madison, 2022
“Perspectives on Net Zero Carbon Processes”.
- Invited Talk: Academia Nacional de Ingeniería del Uruguay: Hidrógeno en Uruguay 2022
“Aportes desde la academia”.
- Invited Contribution: “ Women in Chemical Engineering” special edition of Chemical Engineering Research & Design recognizing the work of 18 women researchers in several areas of Chemical Engineering.
- Invited Talk: Webinar Innovación Química para conseguir los ODS: Construyendo puentes con Iberoamérica (Foro Química y Sociedad, España) 2021
“Aportes desde la Ingeniería de Sistemas de Procesos a los ODS 7, 9 y 13 (energía desarrollo y clima). ”
- Invited Talk: Chemical Engineering Department Seminar, Carnegie Mellon University 2021
“Process systems engineering for transitioning to low carbon economies”.
- Invited Talk: Virtual Workshop Helmántica 2020, Universidad de Salamanca 2020
“Research activities Torres’ group”.

- Award-Invited Talk: Keynote Speaker Celebration of the 10th Anniversary of the ANII- FSE grant 2019
Selection of Project FSE_1_2015_1_109976 as 1 of 6 best projects of the past ten years
Comité de Agenda Fondo Sectorial de Energía, Administración Nacional de Investigación e Innovación, Uruguay,
“Biorefinerías en Uruguay: Evaluación tecno-económica de la producción de combustibles y químicos a partir de materia prima y residuos nacionales”
- Invited Talk: Keynote Speaker 2018
XXIX Interamerican Congress of Chemical Engineering Incorporating the 68th Canadian Chemical Engineering Conference, Toronto, Canada.
“Towards a biomass based chemical industry: recent approaches for product selection and process design”
- Honor: Promoted to Researcher Level I-Sistema Nacional de Investigadores 2018
Administración Nacional de Investigación e Innovación, Uruguay
- Invited Talk: Keynote Speaker 2017
Computer Aided Process Engineering Forum, Athens, Greece
“Design and analysis of bio-refineries as multi-actor networks”
- Honor: Admission as a Researcher: Sistema Nacional de Investigadores-Nivel Candidato 2015
Administración Nacional de Investigación e Innovación, Uruguay
- Award: Doctoral Dissertation Fellowship 2011 - 2012
Award given by the Graduate School to outstanding Ph.D candidates
University of Minnesota, Minneapolis, Minnesota.
- Award: Student Poster Award 2013
Gordon Research Conference (Nanoporous Materials & Their Applications).

PUBLICATIONS All peer-reviewed.

• Journal papers

1. Piedra-Jimenez,F. **Torres, A. I.**, Rodriguez, M.A., “A robust disjunctive formulation for the forest biomass based fuels supply chain under multiple factors of uncertainty”. Submitted.
2. Cárdenas, A., Díaz-Alvarado,F., **Torres, A. I.**, “Green hydrogen production: Process design and capacity expansion integrating economic and operational autonomy objectives”.Submitted. Preprint Chemrxiv
<https://chemrxiv.org/engage/chemrxiv/article-details/64da39124a3f7d0c0d28eb23>
3. Zhang, L., **Torres, A. I.**, Chen, B., Yuan, Z., Grossmann, I.E. “Optimal Retrofitting of Conventional Oil Refinery into Sustainable Bio-refinery under Uncertainty”. Submitted.
4. Ferreira, J., **Torres, A. I.**, Pedemonte, M., “A Kaizen Programming algorithm for multi-output regression based on a heterogeneous island model”. *Neural Computing and Applications*, 2023. Accepted.
5. Corengia, M.,**Torres, A. I.**, “Coupling time varying power sources to production of green-hydrogen: a superstructure based approach for technology selection and optimal design”. *Chemical Engineering Research and Design*, 2022.

6. Ferreira, J., Pedemonte, M., **Torres, A. I.**, “Development of a Machine Learning-based Soft Sensor for an Oil Refinery’s Distillation Column”. *Computers & Chemical Engineering*, 161, 107756, 2022.
7. Li, B., Tian, H., Marvin, W.A., **Torres, A. I.**, Rangarajan, S., “Building compact and accurate mechanistic models of complex catalytic reaction networks via automated generation and reduction”. Submitted.
8. Chaturvedi, T., **Torres, A. I.**, Stephanopoulos, G., Thomsen, M. H., Schmidt, J. E., “Developing Process Designs for Biorefineries-Definitions, Categories, and Unit Operations”. *Energies*, 13(6), 1493, 2020.
9. Corengia, M., **Torres, A. I.**, “Operación óptima de baterías bajo el actual régimen tarifario en Uruguay”. *ENERLAC*, , 5(1), 56, 2020.
10. Ruiz, H. A., Conrad, M., Sun, SN., Sanchez, A., Rocha, G.J.M., Romaní, A., Castro, E., **Torres, A.** , Rodríguez-Jasso, R.M., Andrade, L.P., Smirnova, I., Sun, R-C, Meyer, A.S., “Engineering aspects of hydrothermal pretreatment: From batch to continuous operation, scale-up and pilot reactor under biorefinery concept”, *Bioresour. Technol.*, 299, 122685, 2020.
11. Mangone, F., Ferreira, J., **Torres, A. I.**, “BISSO: Biomass Interface for Superstructure Simulation and Optimization”, *Processes*, 7(10), 645, 2019.
12. Helal, A., Kreimerman, R., Gutiérrez, S., **Torres, A. I.**, “A market-driven algorithm for the assessment of promising bio-based chemicals”, *AIChE J.- Special Edition: “Futures Issue”*., 65(12), e16775, 2019. <https://doi.org/10.1002/aic.16775>
13. Corengia, M., **Torres, A. I.**, “Effect of Tariff Policy and Battery Degradation on Optimal Energy Storage”. *Processes*, 6(10), 204, 2018. *Feature paper*.
14. Vyhmeister, E., Ruiz-Mercado, G, **Torres, A. I.**, Posada, J., “Optimization of multi-pathway production chains and multi-criteria decision-making through sustainability evaluation: a biojet fuel production case study”. *Clean Technol. Envir.*, 20(7), 1697-1719, 2018.
15. **Torres, A. I.**, Stephanopoulos, G., “Design of multi-actor distributed processing systems: a game-theoretical approach”. *AIChE J.- Special Edition “Founders Tribute to Roger Sargent”*, 63, 3369-3391, 2016.
16. Dieste, A., Clavijo, L., **Torres, A. I.**, Barbe, S., Oyarbide, I., Bruno, L., Cassella, F., “Lignin from Eucalyptus spp. Kraft Black Liquor as Biofuel”, *Energy & Fuels*, 30(12), 10494-10498, 2016.
17. Al Wahedi, Y., **Torres, A. I.**, Al Hashimi, S., Dowling, N., Daoutidis, P., Tsapatsis, M. “Economic assessment of temperature swing adsorption systems as Claus tail gas clean up units”, *Chem. Eng. Sci.*, 126, 186-195, 2015.
18. Rajabbeigi, N.*, **Torres, A. I.***, Lew, C. M., Elyassi, B., Ren, L., Wang, Z., Cho, H. J., Fan, W., Daoutidis, P., Tsapatsis, M. “On the kinetics of the isomerization of glucose to fructose using Sn-Beta ”, *Chem. Eng. Sci.*, 116, 235-242, 2014.
19. Daoutidis, P., Kelloway, A., Marvin, W. A., Rangarajan, S., **Torres, A. I.**, “ Process systems engineering for biorefineries: new research vistas ”, *Curr. Op. Chem. Eng.*, 2(5), 442-447, 2013.
20. Daoutidis, P., Marvin, W. A., Rangarajan, S., **Torres, A. I.**, “Engineering Biomass Conversion Processes: A Systems Perspective ”, *AIChE J.*, 59(1), 3-18, 2013. (Cover article)

21. **Torres, A. I.**, Tsapatsis, M., Daoutidis, P., “Biomass to chemicals: Design of an extractive-reaction process for the production of 5-hydroxymethylfurfural”, *Computers & chemical engineering*, 42, 130-137, 2012.
22. Jogwar, S. S., **Torres, A. I.**, Daoutidis, P., “Networks with Large Solvent Recycle: Dynamics, Hierarchical Control and a Biorefinery Application”, *AIChE J.*, 58(6), 1764-1777, 2012.
23. **Torres, A. I.**, Daoutidis, P., Tsapatsis, M., “Continuous Production of 5-Hydroxymethylfurfural from Fructose: a Design Case Study”, *Energy Environ. Sci.*, 3(10), 1560-1572, 2010.
24. Margenat, L., **Torres, A.**, Moyna, P., Heinzen, H., Gonzalez, G., Jachmanian, I., “Lanoline Purification by Selective Extraction of Pesticides Using Supercritical CO₂”, *J. Supercrit. Fluid*, 45(2), 177-180, 2008.
25. Jachmanian, I., Margenat, L., **Torres, A.**, Grompone, M., “Selectivity of Supercritical CO₂ in the Fractionation of Hake Liver Oil Ethyl Esters”, *J. Am. Oil Chem. Soc.*, 84(6), 597-601, 2007.
26. Jachmanian, I., Margenat, L., **Torres, A.**, Grompone, M., “Estabilidad Oxidativa y Contenido de Tocoferoles en el Aceite de Canola Extraído con CO₂ Supercrítico”, *Grasas y Aceites (Spain)*, 57(2), 155-159, 2006.

• Conference papers

1. Zhang, L., **Torres, A. I.**, Chen, B., Yuan, Z., Grossmann, I.E., “Optimal Retrofitting of Conventional Oil Refinery into Sustainable Bio-refinery under Uncertainty”, Proceedings ESCAPE 33, 2023.
2. Ferreira, J., Pedemonte, M., **Torres, A. I.**, “Learning interpretable multi-output models: Kaizen Programming based symbolic regression for estimating outlet concentrations of a splitter”, Proceedings ESCAPE 33, 2023.
3. Avraamidou, S., **Torres, A. I.**, “Circular Economy: Definitions, Challenges, and Opportunities”, Proceedings FOCAPO-CPC 2023.
4. Arsuaga, J., **Torres, A. I.**, “A data driven model for prediction of adsorption energies on metallic surfaces”. *Comput. Aided Chem. Eng.* 51, Eds. Montastruc, L., Negny, S., 2022.
5. Ferreira, J., Pedemonte, M., **Torres, A. I.**, “A multi-output machine learning approach for surrogate modeling generation in process engineering”, *14th International Symposium on Process Systems Engineering*, 2022.
6. Ferreira, J., **Torres, A. I.**, Pedemonte, M., “Towards a Multi-Output Kaizen Programming Algorithm”, *7th IEEE Latin American Conference on Computational Intelligence LA-CCI 2021*. 2021.
7. Corengia, M., Estefan, N., **Torres, A. I.**, “Analyzing Hydrogen Production Capacities to Seize Renewable Energy Surplus”. *Comput. Aided Chem. Eng.* 48, Eds. Pierucci, S., Manenti, F., Bozzano, G. L. & Manca, D., 1549-1554, 2020.
8. Ferreira, J., **Torres, A. I.**, Pedemonte, M., “A comparative study on the numerical performance of Kaizen programming and genetic programming for symbolic regression problems”, *6th IEEE Latin American Conference on Computational Intelligence LA-CCI 2019*, Guayaquil, Ecuador, 2019

9. Ferreira, J., Pedemonte, M., **Torres, A. I.**, “A genetic programming approach for construction of surrogate models”, *Comput. Aided Chem. Eng.* 47, Eds. Muñoz, S. G., Laird, C. D. & Realff, M. J., 451-456, Elsevier, 2019.
10. Corengia, M., **Torres, A. I.**, “Operación óptima de baterías bajo el actual régimen tarifario”, *II Congreso de Agua Ambiente y Energía*, Montevideo, Uruguay, 2019.
11. Estefan, N., **Torres, A. I.**, Bussi, J., “Síntesis, caracterización de catalizadores y evaluación tecno-económica del procesos de síntesis de Fischer- Tropsch a partir de Biosingás”, *X Congreso Argentino de Ingeniería Química-CAIQ2019*, Santa Fé, Argentina, 2019.
12. Corengia, M., **Torres, A. I.**, “Two-phase Dynamic Model for PEM Electrolyzer”, *Comput. Aided Chem. Eng.* 44, Eds. Eden, M. R., Ierapetritou, M. G. & Towler, G. P., 1435-1440, Elsevier, 2018.
13. **Torres, A. I.**, Helal, A., Ures, P., Estefan, N., Kreimerman, R., Gutiérrez, S., “Selección de productos y tecnologías para valorización de residuos de biomasa: PLA como caso de estudio” *Ier Congreso Nacional de Gestión Sostenible de Residuos ímica*, Montevideo, Uruguay, 2017.
14. Gutiérrez, S., Philippi, C., Kreimerman, R., Ures, P., **Torres, A. I.**, “Relevamiento de la biomasa disponible en Uruguay utilizable como materia prima en la producción de químicos”, *Actas del VI Encuentro Regional de Ingeniería Química*, Montevideo, Uruguay, 2017.
15. **Torres, A. I.**, Philippi, C., Ures, P., Kreimerman, R., Gutiérrez, S., “Creación de herramienta computacional para la simulación de procesos de conversión de biomasa”, *Actas del VI Encuentro Regional de Ingeniería Química*, Montevideo, Uruguay, 2017.
16. **Torres, A. I.**, Bochénski, T., Schmidt, J. E., Stephanopoulos, G., “Economically optimal multi-actor processing networks: material flows and price assignment of the intermediates using Lagrangian decomposition”, *Comput. Aided Chem. Eng.* 38, Eds. Kravanja, Z. & Bogataj, M., Elsevier, 2016.
17. Ashraf, M. T., **Torres, A. I.**, Cybulska, I., Fang, C. J., Thomsen, M. H., Schmidt, J. E., Stephanopoulos, G., “Optimization of Lignocellulosic Waste Biorefinery using Multi-Actor Multi-Objective Mathematical Framework”, *Comput. Aided Chem. Eng.* 38, Eds. Kravanja, Z. & Bogataj, M., Elsevier, 2016.
18. Bochénski, T. (*), **Torres, A. I.** (*), Ashraf, M. T., Schmidt, J. E., Stephanopoulos, G., “Evaluation of the production of lipids for fuels and proteins from microalgae by decomposition of the processing network”, *Comput. Aided Chem. Eng.* 38, Eds. Kravanja, Z. & Bogataj, M., 1635-1640, Elsevier, 2016. (*) Igual contribución.
19. **Torres, A. I.**, Cybulska, I., Fang, C. J., Thomsen, M. H., Schmidt, J. E., Stephanopoulos, G. “A novel approach for the identification of economic opportunities within the framework of a biorefinery”, *Comput. Aided Chem. Eng.* 37, Eds. Gernaey, K. V., Huusom, J. K. & Gani, R., 1175-1180, Elsevier, 2015
20. Bonk, F., Chaturvedi, T., **Torres, A. I.**, Schmidt, J. E., Thomsen, M. H., Stephanopoulos, G., “Exploring opportunities for the production of chemicals from municipal solid wastes within the framework of a biorefinery”, *Comput. Aided Chem. Eng.* 37, Eds. Gernaey, K. V., Huusom, J. K. & Gani, R., 2123-2128, Elsevier, 2015.
21. Daoutidis, P., Marvin, W. A., Rangarajan, S., **Torres, A. I.**, “Process Engineering of Biorefineries: Recent Results and New Research Vistas”, *Proceedings FOCAPO 2012*

/ *CPC VIII*, Foundations of Computer-Aided Process Operations - Chemical Process Control Engineering Conferences, Savannah, GA, 2012.

22. **Torres, A. I.**, Tsapatsis, M., Daoutidis, P., “Biomass to chemicals: Design of an extractive-reaction process for the production of 5-hydroxymethylfurfural”, *Comput. Chem. Eng.* 42, Eds. Pistikopoulos, E., Georgiadis, M. & Kokossis, A., 236-240, Elsevier, 2011.

• Book Chapters

1. Corengia , M. , **Torres, A. I.**, “Energy Storage”. *Sustainable design for renewable processes: Principles and case studies*. Ed. Mariano Martín Martín. Elsevier. 2022.
2. Ashraf, M. T. , **Torres, A. I.**, Schmidt, J. E., Stephanopoulos, G., “Analysis and optimization of multi-actor biorefineries”, *Biorefinery-Integrated Sustainable Processes*. Eds. Jens Ejbye Schmidt, Juan Rodrigo Bastidas Oyanedel. Written by invitation. Pags. 49-75, Springer-Cham, 2019.
3. **Torres, A. I.**, Ashraf, M. T. , Chaturvedi, T., Schmidt, J. E., Stephanopoulos, G., “Hydrothermal Pretreatment: Process Modeling and Economic Assessment within the Framework of Biorefinery Processes”, *Hydrothermal Processing in Biorefineries*. Eds. H. A. Ruiz, H. L. Trajano, M. H. Thomsen. Written by invitation. Pags. 207-235, Springer-Cham, 2017.

• Technical Reports

1. **Torres, A. I.**, Gutiérrez, S., Kreimerman, Pittaluga, L., Auriello, J., Arsuaga, J., Estefan, N., González, V., Porley, A., “Diseño y evaluación de alternativas tecnológicas para el desarrollo de bio-refinerías”, Final Report, Project ANII-FSE.1_2018.1_152900, 2022.
2. **Torres, A. I.**, Gutiérrez, S., Kreimerman, R., Estefan, N., Helal, A., Mangone, F., Philippi, C., Tejera, M., Ures, P., “Biorefinerías en Uruguay: Evaluación tecno-económica de la producción de combustibles y químicos a partir de materia prima y residuos nacionales”, Final Report, Project ANII-FSE.1_2015.1_109976, 2019.

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

• Editorial Experience

- *Clean Technologies and Environmental Policy- Springer* Associate Editor to start 2024
- *Processes- MDPI* Invited Editor “Process Systems Engineering à la Canada” since 2018
- *Computational Methods in Chemical Engineering- Frontiers* Member Editorial Board since 2021
- *Clean Technologies and Environmental Policy- Springer* Member Editorial Board since 2018

• Professional Service and Conference Organization Experience

- Director- Environmental Division *American Institute of Chemical Engineers Annual Meeting*, 2024
- Area Chair- Sustainable Engineering Forum *American Institute of Chemical Engineers Annual Meeting*, 2022, 2023

- Organization of the “Simposio de Bio-energía y Bio-refinerías”, *Congreso Iberoamericano de Ingeniería Química* (Santander, España, 2019)
- Scientific Committee Member of: *Process Systems Engineering Conference* (Kyoto, Japan, 2021), *Process Systems Engineering Conference* (San Diego, USA, 2018), *Congreso de la Asociación Argentina de Ingeniería Química* (2017)
- Session Chair/Co-chair: *American Institute of Chemical Engineers Annual Meeting* (Design of Integrated Biorefinery 2015, Process Design 2017, Biofuels production: Design, Simulation and Techno-economic Analysis 2017-2020, Value added co-products from biorefineries 2017)

- **Publications Reviewer Experience**

- Reviewer for: *Clean Technologies and Environmental Policy*, *American Institute of Chemical Engineers Journal*, *Chemical Engineering Research & Design*, *Bioethanol*, *Journal of Cleaner Production*, *Separation and Purification Technology*, *Biochemical Engineering Journal*, *Chemical Engineering Science*, *Waste and Biomass Valorization*, *Bioenergy Research*, *Applied Sciences*, *BMC Chemical Engineering*, *Latin America Applied Research*, *Chemical Engineering and Processing - Process Intensification*, *Industrial & Engineering Chemistry Research*, *Computers & Chemical Engineering*.

- **Proposal (grants/project) Reviewer Experience**

- Reviewer for:
 - ◇ *Chemical, Bioengineering, Environmental, and Transport Systems* - National Science Foundation (2023)
 - ◇ *Petroleum Research Fund*- American Chemical Society-ACS (2022)
 - ◇ *FONCyT Fondo para la Investigación Científica y Tecnológica* - Argentina Proyectos de Investigación Científica y Tecnológica (PICT) (2019)
 - ◇ *ANII Agencia Nacional de Investigación e Innovación* - Uruguay Fondo Clemente Estable (2018), *Visita de Profesores del Exterior* (2018)
 - ◇ *CSIC Comisión Sectorial de Investigación Científica* - Uruguay Programa de Iniciación a la Investigación (2017)
- Member of the evaluation board: *PhD, MSc grants for graduate students* (Science & Technology branch, CAP, UdelaR 2016-2021)

- **Membership to Professional groups:** American Institute of Chemical Engineers, Asociación de Ingenieros Químicos del Uruguay

- **Others:** Member Uruguayan government advisory group for the generation of an academic roadmap to enable the development of the green-hydrogen value chains

PARTICIPATION IN R&D PROJECTS

- “*Process Optimization and Modeling for Minerals Sustainability (PrOMMiS)*” 2023-2026
Funding: *DOE*
- “*Transitioning to decarbonized chemical industries: computational methods for decision making*” 2023-2024
Funding: *Pennsylvania Infrastructure Technology Alliance (PITA)*

- “Diseño y evaluación de alternativas tecnológicas para el desarrollo de bio-refinerías” 2019-2021
Design and evaluation of technologies for the development of bio-refineries (in Uruguay)
Funding: *Fondo Sectorial de Energía, ANII*. Grant FSE_1_2018_1_152900.
Role: Principal Investigator.
- “Desarrollo de proceso para captura de CO₂ en industria del cemento” 2018-2019
Development of a CO₂ capture process for the cement industry
Funding: *Herramientas para la Innovación, ANII- Cementos Artigas S.A.* Grant HPI_X_2018_1_147304
Role: Principal Investigator for UdelaR.
- “Programación genética para la generación de modelos subrogados en ingeniería de procesos”. 2018-2022
Genetic Programming for generation of surrogate models in process engineering
Funding: ANII PhD grant. Role: PhD co-advisor (with M. Pedemonte). Advisee: J. Ferreira.
- “Diseño y optimización de sistemas de almacenamiento de energía de origen renovable”. 2017-2021
Design and optimization of systems for the storage of energy from renewable sources
Funding: UdelaR. Role: PhD advisor. Advisee: M. Corengia
- “Biorefinerías en Uruguay: Evaluación tecno-económica de la producción de combustibles y químicos a partir de materia prima y residuos nacionales” 2015-2018
Biorefineries in Uruguay: technoeconomic evaluation of the production of fuels and chemicals from uruguayan raw materials and residues
Funding: *Fondo Sectorial de Energía, ANII*. Grant FSE_1_2015_1_109976.
Role: Principal Investigator.
- “Computational tools for the design, evaluation and optimizations of sustainable processes”. 2016-2017
Funding: UdelaR-Uruguay, US-EPA, TU-Delft, UC-Chile, Role: co-PI.
- “Biorefinery: Integrated Sustainable Processes for Biomass Conversion to Biomaterials, Bio-fuels, and Fertilizer” 2014-2016
Funding: Masdar Institute (United Arab Emirates): MIT&MI Flagship research project (PI’s: G. Stephanopoulos, MIT; J.E. Schmidt, MI).
Role: Post-doctoral Research associate (MIT 2014), External Consultant until Dec. 2016.

GRADUATE STUDENTS AND RESEARCH ASSISTANTS

- **Graduate Students (current):** Abdulhakeem Ahmed (PhD), Sampriti Chattopadhyay (PhD), Christopher Laliwala (PhD), Unnatti Sharma (PhD), José Arsuaga (MSc.), Valeria González (MSc.).
- **Graduate Students (former):** Jimena Ferreira (PhD-2022), Mariana Corengia (PhD-2022), Akhil Nair (MS-2022), Samarth Palav (MS-2022), Nicolás Estefan (MSc-2020).
- **Research Assistants (former):** Kevin Chang, Melvin Ofosu Koranteng, Agustín Porley, Joana Auriello, Martín Tejera, Franco Mangone, Agustín Helal, Pablo Ures, Carlos Philippi.