



## PAOLA ANDREA DURÁN CUEVAS

### AFFILIATIONS

Associate Professor and Researcher from Center of Plant, Soil Interaction and Natural Resources Biotechnology, Scientific and Technological Bioresource Nucleus (BIOREN)

### CONTACT

Av. Francisco Salazar 01145, PO Box 54-D, 4811230 Temuco, Chile.

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### SHORT BIOGRAPHY

Dra. Paola Durán belong to an interdisciplinary research group (Center of Plant Soil interaction and plant biotechnology) from Scientific and Technologic Bioresource Nucleus, BIOREN) centered on Physicochemistry of Soil and Environment, Soil-Plant Interaction and Plant Nutrition, Plant Physiology and Biotechnology, contributing significantly to plant production especially in cereals as nutrition, biofortification and pathogens biocontrol. Dr. Durán is author and coauthor of more than 15 scientific publications in the last 5 years, highlighting by an important contribution of international researchers and doctorate students as well as post doctorates. During her career as Researcher she has directed and co-directed more than 15 project of great importance national and international. She is director of Chilean Culture Collection of type strain CCCT-UFRONTERA from La Frontera University and member of Advanced Committee of Doctorate in Science of Natural Resources and member of cloister for the same academic program.

### ACADEMIC DEGREES AND PROFESSIONAL STUDIES

2011 Doctor in Plant Biology. Universidad de Barcelona, Barcelona-Spain

2006 Diploma of Advanced Studies. Universidad de Barcelona, Barcelona-Spain

2004 Master in Ecological Agriculture. Universidad de Barcelona, Barcelona-Spain

2001 Agricultural Engineer. Universidad de la Frontera, Temuco- Chile

### RESEARCH LINES

Phytopathology and Biocontrol

Soil Microbial Ecology

Plant-Microorganisms Interactions

### PUBLICATIONS (last 5 years)

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Barra, P., Pontigo, S., Delgado, M., Parra–Almuna, L. , **Duran, P.**, Valentine, A., Jorquera, M.A., Mora, ML (2019). Phosphobacteria inoculation enhances the benefit of P-fertilization on *Lolium perenne* in soils contrasting in P-availability. *Soil Biology and Biochemistry* (in press)

**Duran, P.**, Barra, P. , Jorquera, M., Viscardi, Sh., Fernandez, C. , Mora, ML., Paz, C. and Bol, R. (2019). Occurrence of soil fungi in Antarctic pristine environments. *Front. Bioeng. Biotechnol.* <https://doi.org/10.3389/fbioe.2019.00028>

**Duran, P.**, Tortella, G., Viscardi, Sh, Barra, P., Carrion, V., Mora, ML and Pozo, MJ. (2018) Microbial Community Composition in Take-All Suppressive Soils. *Front. Microbiol.* <https://doi.org/10.3389/fmicb.2018.02198>

Millaleo, R., Rao, M., Ulloa-Inostrosa, E., **Duran, P.** and Mora, ML. (2018). Early responses to Manganese (Mn) excess and its relation to antioxidant performance and organic acid exudation in barley cultivars. *J. Soil Sci. Plant Nutr.* (accepted). <https://doi.org/10.4067/S0718-95162018005003302>.

Redel, Y., Staunton, Sh., **Durán, P.**, Gianfreda, L., Rumpel,, C. and Mora, ML. (2018) Fertilizer P uptake by cereal plant species determined by changes in soil P fractionation and phosphatase activity. *J. soil Sci. plant Nutr.* (accepted). <https://doi.org/10.1007/s42729-019-00024-z>

Barra, P. J., Viscardi, S., Jorquera, M. A., **Duran, P. A.**, Valentine, A. J., and de la Luz Mora, M. (2018). Understanding the Strategies to Overcome Phosphorus–Deficiency and Aluminum–Toxicity by Ryegrass Endophytic and Rhizosphere Phosphobacteria. *Front. Microbiol.* 9, 1–12. doi:10.3389/fmicb.2018.01155.

**Durán, P.**, Viscardi, Sh., Acuna, JJ., Cornejo, P., Azcón, R and Mora, ML (2018). Endophytic selenobacteria and arbuscular mycorrhizal fungus for Selenium biofortification and *Gaeumannomyces graminis* biocontrol. *Journal of Soil Science and Plant Nutrition*, 18 (4), 1021-1035. <https://doi.org/10.4067/S0718-95162018005002902>

**Durán, P.**, Jorquera, M., Viscardi, Sh. Carrion, V., Mora, ML, Pozo, MJ. (2017), Screening and characterization of potentially suppressive soils against *Gaeumannomyces graminis* under extensive wheat cropping by Chilean indigenous communities. *Frontiers of Microbiology.* doi: 10.3389/fmicb.2017.01552

George, T. S., Giles, C. D., **Durán P.**, Haygarth, P. M. (2018). Organic phosphorus in the terrestrial environment: a perspective on the state of the art and future priorities. *Plant and Soil*, 1-2: 191-208. <http://doi.org/10.1007/s11104-017-3391-x>

Mora, M.L., Demanet, R., Acuña, J.J., Viscardi, Sh., Rengel, Z. Jorquera, M and **Duran P. (2017)**. Aluminum-tolerant bacteria improve the plant growth and phosphorus content in ryegrass grown in a Volcanic soil amended with cattle dung manure. *Applied Soil Ecology.* 115: 19-26 doi: 10.1016/j.apsoil.2017.03.013.

**Durán, P.**, Armada, E., López-Castillo O., Cornejo, P., Mora, M.L. and Azcón, R. (2016). Inoculation with selenobacteria and arbuscular mycorrhizal fungi to enhance selenium content in lettuce plants and improve tolerance against drought stress. *Journal of Soil Science and Plant Nutrition.* 16 (1), 201-225.

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- Acuña, J.J., **Durán, P.**, Lagos, L., Ogram, A., Mora, M.L. and Jorquera, M.A. (2016) Bacterial alkaline phosphatase in the rhizospheres of plants grown in Chilean extreme environments. *Biology and Fertility of Soils*. 52: 763–773.
- Cornejo, P., Meier, S., García, S., Ferrol, N., **Durán, P.**, Borie, F., Seguel, A. (2017). Contribution of inoculation with arbuscular mycorrhizal fungi to the bioremediation of a copper polluted soil using *Oenothera picensis*. *Journal of Soil Science and Plant Nutrition*. 17 (1): 14-21, doi: 10.4067/S0718-95162016005000070.
- Santos, C., **Durán, P.**, Tortella, G., Barrientos, L., Briceño, G., Rodríquez, R., Godoy, P., Álvarez-duarte, E., Cruz-Choapa, R., Silva, V., Zaror, L., Rivas, M., Mora, M.L. (2016). The Chilean Network of Microbial Culture Collections: Establishment and Operation. *Bol. Micol.* 31: 44-50. Doi: 10.22370/bolmicol.2016.31.2.491
- Viscardi, Sh., Ventorino, **Durán P** Maggio A, De Pascale, S., Mora, M.L., Pepe, O. (2016). Assessment of plant growth promoting activities and abiotic stress tolerance of *Azotobacter chroococcum* strains for a potential use in sustainable agriculture. *Journal of Soil Science and Plant Nutrition*. 16 (3), 848-863 doi: 10.4067/S0718-95162016005000060.
- Durán, P.**, Acuña, J.J., Gianfreda, L., Azcón, R., Funes-Collado, V. and Mora, M.L. (2015) Endophytic selenobacteria as new inocula for selenium biofortification. *Applied Soil Ecology*, 96: (319-326).
- Mora, M.L., **Durán, P.**, Acuña, J.J., Cartes, P., Demanet, R., and Gianfreda, L. (2015). Improving selenium status in Plant Nutrition and Quality. *Journal of Soil Science and Plant Nutrition*. 15: (486-503).
- Durán, P.**, Acuña, J.J., Jorquera, M.A., Azcón, R., Paredes, C., Rengel, Z. and Mora, M.L. (2014) Endophytic bacteria from selenium-supplemented wheat plants could be useful for plant-growth promotion, biofortification and *Gaeumannomyces graminis* biocontrol in wheat production. *Biology and Fertility of Soils*. *Biology and Fertility of Soils*, 50: (983-990).
- Durán, P.**, Acuña, J.J., Jorquera, M.A., Azcón, R., Borie, F., Mora, M.L. (2013) Enhanced selenium content in wheat grain by co-inoculation of selenobacteria and arbuscular mycorrhizal fungi: a preliminary study as a potential Se biofortification strategy. *Journal of Cereal Science*, 57: (275-280).
- Bech, J., **Durán, P.**, Roca, N., Poma, W., Sánchez, I., Roca-Pérez, L., Boluda, R., Barceló, J. and Poschenrieder, C. (2012). Accumulation of Pb and Zn in *Bidens triplinervia* and *Senecio* sp, spontaneous species from mine spoils in Peru and its potential use in phytoremediation. *Journal of Geochemical Exploration* 123: (109-113)
- Bech, J., Corrales, I., Tume, P., Barceló, J., **Durán, P.**, Roca, N., Poschenrieder, C. (2012). Accumulation of antimony and other potentially toxic elements in plant around a former antimony mine located in the Ribes Valley (Eastern Pyrenees). *Journal of Geochemical Exploration* 113: (100-105)
- Bech, J., Roca, N., Barceló, J., Tume, P., **Durán, P** y Poschenrieder, C. (2012). Soil and plant contamination by lead mining in Bellmunt (Western Mediterranean Area). *Journal of Geochemical Exploration* 113 (94-99)
- Bech, J., **Durán, P.**, Roca, N., Poma, W., Sánchez, I., Barceló, J., Boluda, R., Roca-Pérez, L., Poschenrieder, C. (2012). Shoot accumulation of several trace

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elements in native plant species from contaminated soils in the Peruvian Andes. *Journal of Geochemical Exploration* 113 (106-111)

### INTELLECTUAL PROPERTY

Presented Patent titled: Sesquiterpenos de drimano con aplicación antifúngica. Nº de solicitud: PCT/IB2018/052784

Presented Patent titled: Consorcio microbiano de origen bacteriano para el control de *Gaeumannomyces graminis* var. Tritici  
Nº de solicitud: 2018/15176

### RESEARCH PROJECTS (last 5 years)

2019-2021. INACH. RT\_22-18. Associate Researcher. Interdisciplinary network for study of Antarctic fungal bioactive compounds for control of cancer cells, pathogenic yeasts and bacterial strains to human health.

2018-2020 Responsible Researcher. INACH. RT\_06\_17. Búsqueda de metabólicos secundarios producidos por hongos Antárticos y su efecto antagónico ante *Gaeumannomyces graminis* como modelo de patógenos de suelo.

2016-2019 Responsible Researcher. FONDECYT Iniciación no.11150540. Screening of endophytic bacteria from wheat plants grown in suppressive soil and their biofungicide action against *Gaeumannomyces graminis* in Andisols from southern Chile.

2017-2019. Associate Researcher. Programa de cooperación internacional (PCI) de CONICYT Apoyo a la formación de redes internacionales para investigadores(as) en etapa inicial. REDI170334: Red de proteómica de los biofertilizantes. Entendiendo los mecanismos de interacción planta-bacteria en suelos ácidos mediante técnicas proteómicas.

2018-2019. Associated Researcher. MEC MEC80170096. Fortalecimiento en alumnos del pre y postgrado, I&D y docencia de la Universidad de La Frontera, en el conocimiento, desarrollo actual y aplicación de la Nanobiotecnología.

2016-2019 Associate Researcher. INACH. RT\_02\_16. Bacterias antárticas asociadas a plantas y su contribución para mitigar los daños por heladas en plántulas de paltos.

2016-2026 Associate Researcher. CORFO 16PTECF5-66647. Centro para la Investigación e Innovación en Fruticultura para la Zona Sur.

2017-2018 Associate Researcher, PIA-UFRO (PIA17-0006) *Aspergillus* section Nigri in Chilean traditional chilli (Merkén) produced by Mapuches Communities of La Araucanía Region and Ochratoxin A contamination: Establishing guidelines for sustainable, safe and high quality Merken.

2016-2017 Associate Researcher. PIA-UFRO (PIA16-0005). Efecto de la inoculación de un consorcio microbiano basado en bacterias promotoras de crecimiento vegetal y hongos micorrízicos tolerantes a cobre en *Imperata condensata* para estrategias de biorremediación de suelos contaminados.

2016-2017 Associate Researcher. PIA-UFRO (PIA16-0005). Fungal resources and biotechnology: could methods of preservation affect the biotechnological potential of fungal strains preserved over the time in culture collections?.

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- 2012-2015 Responsible Researcher. FONDECYT Postdoctorado no.3130542. Enhanced organic selenium in wheat grain by selenobacteria and arbuscular mycorrhizal fungi as biofortification technology.
- 2014-2017 Co-researcher. FONDECYT no. 1141247. Improving phosphorus efficiency use and aluminum detoxification on pastures growing in acid volcanic soils throughout biotechnological tools.
- 2013-2016 Co-researcher. Exploration of rhizobacterial diversity and phytase genes in plants grown in extreme Chilean environments. Concurso Apoyo al Desarrollo de Proyectos de Investigación Chile-EE.UU. code USA2013-0010.
- 2010-2014 Associate Researcher. FONDECYT no. 1100625. Crop rhizosphere management in acid Andisols of Southern Chile for improving plant nutrition and food quality.
- MEC 2013 Co-researcher. Concurso nacional de atracción de capital humano avanzado del extranjero. Role of enzymes in the plant-Soil\_microbiota System in the Rhizosphere of crops produced in volcanic Chilean Soils.

### OUTREACH PROJECTS

Capacitación técnico-científica de comunidades mapuche productoras de merken de la región de la Araucanía: una estrategia basada en la pertinencia cultural para la prevención del riesgo de contaminación de Merken por micotoxinas. EXT18-0043. **Co- Responsible.**

III seminario Internacional, 2016: Microorganismos rizosféricos y sus aplicaciones biotecnológicas. Cod. EXS16-0197. **Responsible Researcher**

Satellite meeting Soil Plant and microorganisms 2015, Cod. EXT15-0090. **Co-Responsible**

### PRESENTATIONS AT NATIONAL/INTERNATIONAL CONGRESSES

**Duran P.**, Tortella, G, Viscardi, Sh., Mora, ML and Pozo MJ (April, 2018). Oral Presentation Microbial community composition in take-all suppressive soils. XV Meeting of the Working Group "Biological and integrated control of plant pathogens. Lleida- Spain.

**Duran, P.**; Viscardi, SN.; Carrion, V.; Mora, ML.; Pozo, MJ. (2017). Suppressive soils against Gaeumannomyces graminis of soils under monoculture management is regulated by rhizosphere microorganisms. 7 Congress of European Microbiologists (FEMS), Valencia- España.

**Durán, P.**, Acuña, J.J, Jorquera, M., Viscardi, Sh., Mora M.L., Pozo MJ. (Septiembre, 2016) XIV Meeting of the IOBC-WPRS Working Group Biological Control of Fungal and Bacterial Plant Pathogens Biocontrol and Microbial Ecology, Berlín-Alemania

Acuña, J., P. Durán, L. Lagos, A. Ogram, M.L. Mora and M. Jorquera. 2016. Bacterial alkaline phosphatase in the rhizospheres of plants grown in Chilean extreme environments. Organic Phosphorus Workshop 2016, September 5-9, Lake District, England

**Duran, P**, Acuña, J.J., Jorquera, M., Paredes, C. and Mora, M.L. 20<sup>th</sup> World Congress of Soil Science. 2014. Isolation of putative endophytic bacteria from selenium-supplemented wheat plants and their potential use for biofortification and biocontrol of a soil borne pathogen

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**Duran, P.**, Acuña, J.J., Jorquera, M. and Mora, M.L. *II Conferencia iberoamericana de interacciones beneficiosas microorganismo-planta-ambiente* (Sept, 2013) selenium biofortification in wheat plants by co-inoculation of selenobacteria strains and arbuscular mycorrhizal fungi for obtaining enriched selenium foods (Oral presentation)

Mora, ML, Acuña, J.J., **Durán, P** and Demanet, R. (Septiembre, 2013). Organic selenium forms from selenobacteria strains able to enhance selenium in wheat grain. *II Conferencia Iberoamericana de Interacciones Beneficiosas Microorganismo-Planta-Ambiente (IBEMPA)*. Sevilla, Spain. *Accepted*

Acuña J., **Durán P.**, Jorquera M. and M.M Mora. Selenium compounds formed by selenobacteriaselected from the rhizosphere as a potential biofertilizer for biofortification of wheat crops. *FEMS Microbiology Congress 2013*. Leipzig, Germany. *Accepted*

Bech, J., **Duran, P.**, Poma, W., Sánchez, I., Barceló, J., Roca, N., Boluda, R., Roca-Pérez, L., Poschenrieder, C. *European Geosciences Union* (mayo, 2010). The first report of Pb and Zn accumulation in some native plants from the Peruvian Andes. Viena (Austria). 12 (2716)

Bech, J.; Corrales, I; **Duran, P**, Roca, N; Tume, P; Barceló, J; Poschenrieder, Ch. *European Geosciences Union* (May, 2010). Accumulation of antimony and other potentially toxic elements in plants around a former antimony mine located in the Ribes Valley (Eastern Pyrenees), Viena (Austria), 12 (2713)

Bech J., **Duran, P.**, Barceló, J., Roca, N., Tume, P., Poschenrieder, Ch. *European Geosciences Union* (May, 2010). Soil and plant contamination by lead mining in Bellmunt (Western Mediterranean Area), Viena (Austria), 12 (2704)

Bech J., **Duran, P.**, Roca, N., Poma, W., Sánchez, I., Barceló, J. y Poschenrieder, Ch. *European Geosciences Union* (May, 2011). Accumulation of Pb and Zn in *Bidens triplinervia* and *Senecio* sp, spontaneous species from mine spoils in Peru, as potential use for phytoremediation in South America. Viena (Austria), 13 (1924)

Bech, J., Barceló, J., Roca, N., Tonón, L., **Duran, P.**, Larriva, G. y Poschenrieder, Ch. *European Geosciences Union* (May, 2011). Trace element accumulation in plants from mine soils at a silver mining area in southern Ecuador. Viena (Austria), 13 (1126)

Bech, J., **Duran, P.**, Roca, R., Barceló, B., Boluda, R., Roca-Perez, L., and Poschenrieder, Ch. *European Geosciences Union* (May, 2011). Accumulation of heavy metals in plants growing around an abandoned mine in Poblet, Tarragona (NE Spain), Viena (Austria), 13 (2311)

#### NATIONAL

**Duran, P.;** Jorquera, M.; Viscardi, SN.; Carrion, V.; Mora, ML.; Pozo, MJ. (2017). screening and characterization of potentially suppressive soils against *Gaeumannomyces graminis* under extensive wheat cropping by Chilean indigenous communities. *Congreso latinoamericano de Fitopatología*. SOFICHIT

**Durán, P.;** Acuña, J.; Jorquera, M.; Viscardi, SH.; Mora, ML.; Pozo, MJ (2016): Take all suppression and microorganisms involved in the decline of disease in southern Chile take all suppression in andisol from Chile. *III Taller Latinoamericano de PGPR*.

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- Jorquera, M., J. Acuña, P. **Duran, P.** Barra, L. Lagos, F. Cid, J. Rilling, N. Inostroza, O. Navarrete & M.L. Mora. 2016. Bacterias promotoras del crecimiento vegetal de ambientes extremos chilenos. 3er Workshop
- Duran, P.**, Bech, J., Roca, N., Poschenrieder, C. and Mora, M.L. *Workshop: 3<sup>rd</sup> International workshop: Advances in Science and Technology of Bioresource*, Pucón, (November, 2011). The first report of Pb and Zn accumulation in native plants from Peruvian Andes, 19.
- Duran, P.**, Acuña, J., Jorquera, M.A. and Mora, M.L. Congreso Chileno de Microbiología, Valdivia (2012). Enhanced selenium content in wheat grain by co-inoculation of selenobacteria and arbuscular mycorrhizal fungi as a potential flour biofortification strategy, B82.
- Acuña, J.J., **Duran, P.**, Jorquera, M.A. and Mora, M.L. XXXIV Congreso Chileno de Microbiología, Valdivia (Noviembre, 2012). Organic selenium forms from selenobacteria strains able to enhance selenium in wheat grain as a potential biofertilizer, B2
- Durán, P.**, Acuña, J.J, Jorquera, M. and Mora, M.L. (2013) Isolation of putative plant-growth promoting endophytic bacteria from selenium-biofortified wheat plants and their potential protective effect against fungal soil-borne pathogen *Gaeumannomyces graminis*

### **SUPERVISOR OF POST-GRADUATE AND PREGRADUATED FINISHED THESIS**

- 2017-actual: Tutor PhD student Maryannis Chavez, Doctorado en Ciencias de Recursos Naturales Universidad de la Frontera
- 2017- actual: Co-tutor PhD student Blenda Silva, Universidad de Amazonas, Brazil
- 2014- 2016: Co-Tutor PhD student Sharon Viscardi, University of Federico II, Napoli-Italy.
- 2017: Tutor undergraduate thesis. Biotechnologist, Pedro Huenchual; University of La Frontera, Temuco-Chile.

### **SUPERVISOR OF UNDERGRADUATE THESIS AND PRACTICES**

- 2018- actual: Tutor undergraduate thesis. Biochemists, Isabel Mendez; University of La Frontera, Temuco-Chile. N° Matrícula 19005921914, Thesis name: Biocontrol de *Gaeumannomyces graminis* en trigo mediante el uso de bacterias aisladas de suelos supresivos.
- 2017-actual: Tutor undergraduate thesis. Biochemists, Camila Fernandez; University of La Frontera, Temuco-Chile. N° Matrícula 19305547814, Thesis name: Metabolitos secundarios producidos por bacterias aisladas de suelos supresivos y su rol en el biocontrol de *Gaeumannomyces graminis*
- 2018-actual: Tutor undergraduate practice. Biochemists. María Jose Ruiz; University of La Frontera, Temuco-Chile. N° Matrícula: 19809685716
- 2018-actual: Tutor undergraduate practice. Biochemists. Valentina Fritz; University of La Frontera, Temuco-Chile. N° Matrícula: 19764735316
- 2018-actual: Tutor undergraduate practice. Biotechnologist. Catalina Jara; University of La Frontera, Temuco-Chile. N° Matrícula: 20060842917
- 2018-actual: Tutor undergraduate practice. Biotechnologist. Carlos Patterson; University of La Frontera, Temuco-Chile. N° Matrícula: 20080342617

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## **ACADEMIC RESPONSABILITIES**

2017- actual, cloister professor in Doctorate in Science and Natural Resources, Universidad de la Frontera

2017: Colaborator profesor, course: Fundamentos Científicos de la Producción Agroalimentaria (DCA001), programa de Doctorado en Cs. Agroalimentarias y Medio Ambiente

2017-actual, Tutor of PhD student Mariannys Chavez, Doctorate in Science and Natural Resources, Universidad de la Frontera

2016-actual, Examining commission PhD student Marcia Astorga, Doctorate in Science and Natural Resources, Universidad de la Frontera

2014-Actual: Responsible professor, course: Microbiology of plant-soil system (ICQ455), Universidad de la Frontera (Temuco-Chile).

2015-2016: Responsible Professor, course: Sanidad Vegetal, Universidad Católica (Temuco-Chile)

2015- actual Member of advanced commite, Doctorado en Ciencias de Recursos Naturales Universidad de la Frontera

2015- actual Co-Director of Chilean culture collection (CCCT-UFRO) resol. 226

2015- actual Organizing Committee of VI workshop Internacional: Avances en Ciencias y Tecnología en Biorecursos

## **CONSULTANCY SERVICES FOR PUBLIC INSTITUTIONS**

2018- at date Member of study group Instituto Antártico Chileno (INACH)

2018-at date Member of Network of Bioproducts (Chile)

2015-at date Sub-director of Chilean Culture collection (CCCT-UFRO)

## **ACHIEVEMENTS**

2005 Mutis Scholarship (Postgraduate studies), Spanish Agency of International Cooperation (AECI), Spain

2001 Universidad de la Frontera award (Better academically), La Frontera University



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