Edgar F. Ferrer-González Ph.D.

Molecular Biologist · Antimicrobial Drug Discovery · Translational & Microbiome Science · Platform Builder

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PROFESSIONAL SUMMARY

Ph.D. molecular biologist and drug discovery scientist with 9 years of experience spanning antimicrobial pharmacology, host–microbiome science, biomarker discovery, and consumer health innovation. Career defined by a consistent pattern: identifying high-value biological questions, building the experimental platforms to answer them, and driving science from hypothesis to published, patented, and commercially meaningful results. Expertise across the full molecular and biophysical toolkit, multi-omics, quantitative pharmacology, and scientific computing, complemented by demonstrated leadership in cross-functional program governance and external collaboration management. Author of 7 peer-reviewed publications, co-inventor on a commercialized U.S. patent, and an experienced scientific communicator to technical and executive audiences.

PROFESSIONAL EXPERIENCE

Scientist, Host-Microbiome & Science Platforms Innovation

May 2021 – Present

Reckitt · Montvale, NJ

- Created multiple host–microbiome interaction models for the personal care division and orchestrated a biofilm and germ-protection science platform from the ground up where none previously existed.
- Pioneered a targeted germ-protection strategy — a microbiome-compatible approach that selectively eliminates pathogens while preserving commensal microbiota — establishing differentiated next-generation product positioning.
- Leads biomarker and translational research using multi-omics platforms (16S rRNA, shotgun metagenomics, bulk RNA-seq) integrated with inflammatory marker profiling (IL-6, IL-8, TNF-α via MSD multiplex) in primary human cell and 3D reconstructed tissue models.
- Co-developed and validated a quantitative HPLC method for lactoferrin established as the manufacturing QC release standard for an FDA Class II medical device product.
- Co-planned human volunteer studies measuring physiological and barrier endpoints (TEWL, skin hydration, inflammatory markers); generates evidence packages supporting FDA, EPA, and BPR regulatory submissions.
- Manages 5+ simultaneous innovation programs as discovery portfolio lead with formal budget ownership and PO execution authority; scientific lead for monthly SVP-level stage-gate governance reviews (Veeva, Accolade).
- Works with bacteriophage biology — jumbo phage characterization, phage cocktail design, host-range panel construction against surface pathogens for antimicrobial efficacy testing (EN 1276).
- Coordinates international CRO partnerships across the US, EU, and Asia-Pacific; integrates Python, R, AlphaFold, and LLM tools into experimental design, multi-omics analysis, and literature synthesis; mentors ~4 scientists and research associates.

Graduate Research Fellow, Pilch Laboratory

Jun 2015 – May 2021

Rutgers University · New Brunswick, NJ

- Led a multi-year FtsZ small-molecule antibacterial drug discovery program from hit identification through in vivo efficacy validation against multidrug-resistant MRSA and Gram-negative pathogens.
- Built and operated a complete biophysical and functional characterization platform from scratch: SPR, ITC, fluorescence anisotropy, enzymatic rate assays (FtsZ GTPase, PBP DD-carboxypeptidase/β-lactam hydrolysis), circular dichroism, and DLS.
- Constructed a structure–activity relationship database that directly informed medicinal chemistry optimization; identified that an alkyne head group produced a 10-fold lower K_d versus trifluoromethyl, validated by MIC improvement from 1 to 0.25 μg/mL against MRSA.
- Performed extensive protein engineering and molecular biology: directed evolution, error-prone PCR, site-saturation and site-directed mutagenesis, synthetic gene constructs, phage display, and recombinant protein expression (E. coli, yeast, mammalian) with FPLC purification.
- Applied flow cytometry, confocal and super-resolution microscopy, and Cryo-EM for cellular and ultrastructural characterization; contributed to in vivo murine peritonitis efficacy studies under IACUC-approved protocols.
- Confirmed compound–target interactions through collaborative X-ray crystallography; analyzed pharmacokinetic data (AUC) from plasma and urine matrices.

Research Intern, Zhang Laboratory — Oncology Drug Discovery

Summer 2011

MD Anderson Cancer Center · Houston, TX

- Applied Schrödinger Suite and MOE for structure-based and ligand-based computational modeling of PDK1 kinase inhibitors in the PI3K/AKT oncology signaling pathway.

Research Intern, Nanotoxicology & Neural Cell Biology

Summer 2010

NASA Ames Research Center · Mountain View, CA

- Characterized cytotoxicity of carbon nanofibers on HCN-2 human cortical neurons, applying rigorous safety-assessment methodology to evaluate biological risks of engineered nanomaterials.

Teaching Assistant, Genetics & Introduction to Biological Sciences

Aug 2012 – May 2013

University of Puerto Rico – Mayagüez · Mayagüez, PR

Student Assistant, Master of Biomedical Sciences Program Oct 2017 – Mar 2021

Rutgers Robert Wood Johnson Medical School · New Brunswick, NJ

EDUCATION

Ph.D., Cellular and Molecular Pharmacology Jun 2015 – May 2021

Rutgers University, Robert Wood Johnson Medical School · New Brunswick, NJ · Advisor: Daniel S. Pilch, Ph.D.

- Thesis: *Insights into FtsZ Inhibitors and Their Use against Antibiotic-Resistant Bacterial Pathogens.*

M.S., Biology 2012 – 2015

University of Puerto Rico – Mayagüez · Mayagüez, PR · Advisor: Carlos Ríos-Velázquez, Ph.D.

- Thesis: biocatalytic activity screening for N-ε-carboxymethyl-lysine in metagenomic libraries (functional metagenomics; ~1M-clone library construction and screening).

B.S., General Biology & B.S., Industrial Microbiology (dual degrees) 2007 – 2012

University of Puerto Rico – Mayagüez · Mayagüez, PR

PATENT

1. Pilch, D.S., **Ferrer-González, E.**, LaVoie, E.J. **Fluorescent probes for the visualization of FtsZ in bacterial pathogens.** U.S. Patent 12,061,201 B2 (2024). Licensed and commercialized via MilliporeSigma as BioTracker SCT090.

PEER-REVIEWED PUBLICATIONS

1. **Taxonomic and functional profiling of the vulvar microbiome indicates variations related to ecological signatures, aging, and health status.** *Frontiers in Microbiology* (2025). DOI: 10.3389/fmicb.2025.1633147
2. **A benzamide FtsZ inhibitor with superior bactericidal activity against multidrug-resistant *Staphylococcus aureus*.** *ACS Chemical Biology* (2023). DOI: 10.1021/acschembio.2c00838
3. **Combination of an FtsZ inhibitor potentiates the in vivo efficacy of oxacillin against methicillin-resistant *Staphylococcus aureus*.** *Medicinal Chemistry Research* (2022).
4. **Novel MreB inhibitors with antibacterial activity against Gram-negative bacteria.** *Medicinal Chemistry Research* (2022).
5. **Impact of FtsZ inhibition on the localization of the penicillin binding proteins in methicillin-resistant *Staphylococcus aureus*.** *Journal of Bacteriology* (2021). DOI: 10.1128/jb.00204-21
6. **Structure-guided design of a fluorescent probe for the visualization of FtsZ in clinically important Gram-positive and Gram-negative bacterial pathogens.** *Scientific Reports* (2019). DOI: 10.1038/s41598-019-56557-x
7. **β-Lactam antibiotics with a high affinity for PBP2 act synergistically with the FtsZ-targeting agent TXA707 against methicillin-resistant *Staphylococcus aureus*.** *Antimicrobial Agents and Chemotherapy* (2017). DOI: 10.1128/AAC.00863-17

SELECTED CONFERENCE PRESENTATIONS

1. Host-Microbiome Science Platform and Next-Generation Germ Protection. *Reckitt Global Science Symposium* (2021–Present), Internal.
2. Synergistic Effect of β-Lactam Antibiotics and FtsZ Inhibitors Against MRSA. *SACNAS Annual Meeting*, Honolulu, HI (2019).
3. Mapping Biocatalytic Genes for N-ε-(Carboxymethyl)-Lysine. *ASM General Meeting*, New Orleans, LA (2015).
4. Isolation of Biocatalytic Genes Using Functional Soil Metagenomics. *ASM General Meeting*, Boston, MA (2014).
5. Biocatalytic Activity Screening for N-ε-(Carboxymethyl)-Lysine. *AAAS Regional Meeting*, Puerto Rico (2013).
6. Identification of Gene(s) from Clones Metabolizing N-ε-(Carboxymethyl)-Lysine. *ASM General Meeting*, Denver, CO (2013).
7. Unravelling Potential Medical Bioremediation Activities Using Metagenomics. *ASM General Meeting*, San Francisco, CA (2012).
8. Development of Novel Structure/Ligand-Based Models for the Human PDK1 Kinase Domain. *U54 Poster*, Centro Comprensivo de Cáncer UPR, San Juan, PR (2011).
9. Cytotoxicity Studies of Carbon Nanofibers on HCN-2 Human Cortical Neurons. *Neuroprotective Agents Conference*, Monterey, CA (2010).

HONORS, AWARDS & FELLOWSHIPS

- NIH Bridges to the Doctorate Fellowship (2013–2015)
- UPRM-HHMI Outstanding Graduate Student Award (2013)
- NIH RISE2BEST Undergraduate Research Fellowship (2010–2012)
- Rutgers-SGS Aaron Shatkin Scholarship (2020)
- North East Alliance (NEA) Science Day, Best Poster (2013)
- Beta Beta Beta — John C. Johnson Award, Best Poster (2010)

TECHNICAL & SCIENTIFIC SKILLS

Molecular Biology & Protein Engineering: Gene synthesis & synthetic constructs, site-directed/site-saturation mutagenesis, error-prone PCR, directed evolution, phage display, strain construction, molecular cloning (Gibson, restriction-ligation), recombinant protein expression (E. coli, yeast, mammalian), FPLC purification (affinity, SEC, IEX).

Biophysical Characterization: SPR, ITC, fluorescence anisotropy, circular dichroism, dynamic light scattering, enzymatic rate assays, dose-response profiling (IC50, EC50).

Cell Biology & Immunology: Primary human cell culture (epithelial, mucosal, fibroblast, epidermal), 3D reconstructed tissue models, MTT cytotoxicity, cytokine profiling (MSD multiplex, ELISA), barrier gene expression, immunofluorescence, flow cytometry, Western blot.

Multi-Omics & Sequencing: 16S rRNA sequencing, shotgun metagenomics, bulk RNA-seq (DESeq2), NGS library construction, functional metagenomics, multi-omics data integration.

Microbiology: Antimicrobial susceptibility testing (CLSI), MIC determination, biofilm assays (ASTM E2799), bacteriophage biology & host-range characterization, microbial ID, ESKAPE pathogen handling.

Analytical Chemistry: HPLC (preparative, analytical, chiral), small-molecule mass spectrometry, analytical method development & validation.

Microscopy: Confocal fluorescence, super-resolution, Cryo-EM, TEM, live-cell imaging.

Computational & Data Science: Python, R, statistical analysis, AlphaFold, Schrödinger Suite & MOE (docking, homology modeling), PyMOL & Chimera, LLM integration for scientific workflows.

Program Management & Regulatory: Multi-program portfolio leadership, SVP-level governance, Veeva & Accolade, formal budget/PO ownership, international CRO management, GLP, GCP (NIDA CTN), Animal Research/3Rs, FDA Class II, EPA, BPR, Google Project Management Certificate (2026).

MENTORING, LEADERSHIP & LANGUAGES

Mentored ~10 individuals across career: ~4 scientists and research associates at Reckitt, ~4 undergraduate/graduate students and laboratory technicians at Rutgers, and ~2 undergraduate researchers at UPR-Mayagüez. Media Coordinator, Seeding Labs Rutgers Chapter (2016–2019), supporting global science-equity outreach.

English (Native) / Spanish (Native)