

Elena Gramellini

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Beyond Standard Model & Neutrino Physics
Noble Element Detectors & Light Collection Systems

ACADEMIC & RESEARCH POSITIONS

Ernest Rutherford Fellow

Science and Technology Facilities Council (UKRI), UK

Awarded in 2022, accepted

Wilson Fellow

Fermi National Accelerator Laboratory (FNAL), USA

Offered in 2022, rejected

Lederman Fellow

Fermi National Accelerator Laboratory (FNAL), USA

Sept 2018 - Dec 2022

EDUCATION

Yale University

PhD in Physics

New Haven, USA

2013-2018

Measurement of the Negative Pion and Positive Kaon Total Hadronic Cross Sections on Argon at the LArIAT Experiment.

Advisors: Prof. B. Fleming, Prof. F. Cavanna

Università di Bologna

M.S in Nuclear and Particle Physics

Bologna, IT

2009-2012

Study of Low p_T D^0 Meson Production Cross Section at CDF II in $p\bar{p}$ Collisions at $\sqrt{s} = 900$ GeV.

Advisor: Prof. S. Zucchelli

Università di Bologna

B.S in Physics

Bologna, IT

2006-2009

Optimization of the Vertex Reconstruction in OPERA Neutrino Interaction Events.

Advisor: Prof. M. Sioli

AWARDS & SCHOLARSHIPS

FNAL Exceptional Performance Recognition Award, FNAL, USA

2020

Dean's Emerging Scholars Research Award, Yale University, USA

2017

Best poster at the 2017 International Neutrino Summer School, FNAL, USA

2017

Universities Research Association Visiting Scholar Award, URA, USA

2015

Leigh Page Prize, Yale University, USA

2013

Master's Thesis Degree Award, Franco Rimondi Association, Italy

2013

Scholarship for international thesis, University of Bologna, Italy

2011-2012

PEER-REVIEWED GRANTS

Fermi National Accelerator Laboratory

PI: \$275k

2020 - 2022

Laboratory Directed Research & Development (LDRD).

UV Light Detection with Thin Films of Amorphous Semiconductors for Imaging with Liquid Argon Scintillation Light (LILAr).

Argonne National Laboratory

Co-PI: 0.3M node hours

2020 - 2021

Advanced Scientific Computer Research Leadership Computing Challenge (ALCC) Award.

Reconstructing Neutrino Data with the MicroBooNE Liquid Argon Detector.

COLLABORATION MEMBERSHIP

MicroBooNE (190 members), LArIAT (70 members), and DUNE through the Q-Pix Consortium (30 members).

LEADERSHIP ROLES & ACADEMIC SERVICE

Cross Section Group Convener	MicroBooNE	2022
NuMI Group Convener	MicroBooNE	2020 - 2022
Cosmic Ray Tagger (CRT) Expert	MicroBooNE	2017 - present
LArIAT Lead Analyzer	LArIAT	2015 - 2019

SELECTED PUBLICATIONS **Inspire hep h-index: 36**

I am co-author on more than 100 articles in peer-reviewed journals on a wide variety of topics including hadron and neutrino cross sections, detector physics, and physics of fluids in collaboration with MicroBooNE (34 papers), LArIAT (2 papers), CDF (73 papers) and with limited authorship (3 papers). My most relevant publications are:

- MicroBooNE Collaboration, 2021
Search for an anomalous excess of charged-current ν_e interactions without pions in the final state with the MicroBooNE experiment [e-Print: 2110.14065](#), accepted to PRD.
- MicroBooNE Collaboration, 2021
First Measurement of Inclusive Electron-Neutrino and Antineutrino Charged Current Differential Cross Sections in Charged Lepton Energy on Argon in MicroBooNE, [PhysRevD 105 \(2022\) 051102](#).
- MicroBooNE Collaboration, 2021
Measurement of the Flux-Averaged Inclusive Charged-Current Electron Neutrino and Antineutrino Cross Section on Argon Using the NuMI Beam and the MicroBooNE Detector, [Phys.Rev.D 104 \(2021\) 5, 052002](#).
- LArIAT Collaboration, 2021
Measurement of the (π^- , Ar) Total Hadronic Cross Section at the LArIAT Experiment, [e-Print:2108.00040](#) submitted to Physical Review D.
- K. Duffy, A. P. Furmanski, E. Gramellini, O. Palamara, M. Soderberg & T. Yang, 2021
Neutrino Interaction Measurements with the MicroBooNE and ArgoNeuT Liquid Argon Time Projection Chambers. European Physical Journal Special Topics (EPJ-Special Topics), [Eur. Phys. J. Spec. Top. 230, 4275–4291 \(2021\)](#).
- S.K. Barman, M.N. Huda, J. Asaadi, E. Gramellini, D. Nygren, 2021
First Principles Studies of the Surface and Opto-Electronic Properties of Ultra-Thin t-Se, [e-Print: 2104.14455](#), submitted to Langmuir, American Chemistry Society.

- A. Abba *et al.*, 2021
The Novel Mechanical Ventilator Milano for the COVID-19 Pandemic,
Physics of Fluids 33, 037122. DOI: [10.1063/5.0044445](https://doi.org/10.1063/5.0044445).
- MicroBooNE Collaboration, 2019
Design and Construction of the MicroBooNE Cosmic Ray Tagger System,
Journal of Instrumentation, 14 P0400. DOI: [10.1088/1748-0221/14/04/P04004](https://doi.org/10.1088/1748-0221/14/04/P04004).

CONFERENCE TALKS, POSTERS & SEMINARS

Plenary And Invited Talks:

- 2021 Rising Stars In Particle Physics, University of Chicago
Critical Measurements & Technological Advancements on the path to DUNE
- 2021 LIDINE, San Diego (Keynote speaker), recordings available [here](#)
Liquid Argon TPCs for Neutrino Detection
- 2021 54th Fermilab Users Meeting
MicroBooNE Cross Section Measurements
- 2021 Instrumentation Frontier Workshop CPAD, Stony Brook University
Thin A-Se Films for Novel Scintillation Light Detectors
- 2019 Module of Opportunity Workshop, Brookhaven National Lab, USA
Q-Pix Light Readout
- 2015 New Perspectives, FNAL, USA
LArIAT: Liquid Argon In A Testbeam

Parallel Talks:

- 2021 NuFact, Cagliari, Italy
Recent neutrino cross-section results from MicroBooNE
- 2019 Instrumentation Frontier Workshop CPAD, Madison, USA
Novel VUV Light Detection in Pixelated Liquid Argon Time Projection Chambers
- 2017 American Physics Society, Division of Particles and Fields, Fermilab, USA
A Study of the Inclusive Hadronic Kaon-Argon Interaction Cross Section
- 2015 Topics in Astroparticle and Underground Physics, Turin, Italy
Studies of Cosmogenic Background to Nucleon Decay in MicroBooNE
- 2015 Conference at the Intersection of Particle And Nuclear Physics, Veil, USA
LArIAT - Liquid Argon In A Testbeam

Posters:

- 2017 International Neutrino Summer School, FNAL, USA
A Study of the Inclusive Hadronic Kaon-Argon Interaction Cross Section
- 2016 International Conference on High Energy Physics, Chicago, USA
A MC Study of Kaon Identification Sensitivity in MicroBooNE
- 2016 International Conference on High Energy Physics, Chicago, USA
Study of the Positive Kaon Total Interaction Cross Section on Ar in LArIAT

Seminars:

- 2020 INPA Seminar, Lawrence Berkeley National Lab, USA
Seeing the Light in Pixelated TPC: QPix and LILAr
- 2020 PAN Seminar, Wayne State University, USA
The What, the Why and the How of Testbeam Experiments for Neutrinos
- 2020 High Energy Physics Seminar UC Santa Barbara, USA

- 2019 *Q-Pix, a Pixel Revolution for TPCs at the Multi-Kiloton Scale*
 FNAL Neutrino Seminar & Illinois Institute of Technology Seminar
I Scream You Scream We All Scream for TestBeam
- 2018 Physics Department Seminar, University of Bologna & INFN, Italy
Liquid Argon Detectors for Neutrino Physics @FNAL
- 2017 High Energy Physics Group Seminar, Imperial College of London, UK
Liquid Argon Under Investigation: First Results from the LArIAT Experiment
- 2017 Second UK LArSoft Workshop, Manchester University, UK
LArSoft Architecture, MC and Grid Submission
- 2017 Joint SBN-DUNE Meeting, FNAL, USA
MuCS Measurements and CRT Measurements
- 2017 Niel Bohr Lunch Seminar, Manchester University, UK
Liquid Argon Under Investigation: First Results from the LArIAT Experiment
- 2016 Wright Laboratory Seminar, Yale University, New Haven, USA
LArIAT: Total π -Ar Cross Section Measurement

MENTORING & TEACHING

Mentoring:

I have significant experience in mentoring and guiding younger scientists. While at Yale, I mentored several undergraduate and lower cohort post-grad students to complete their summer projects in both the LArIAT and MicroBooNE experiments; my mentees include Supraja Balasubramanian (Yale PhD student, now FNAL postdoc), William De Rocco (Yale undergrad, now Stanford PhD student), and Daniel Smith (Boston University undergrad, now University of Chicago PhD student).

As convener of the MicroBooNE NuMI group, I am now responsible to supervise the analyses of about 10 PhD candidates from the universities of Cambridge, Manchester, Warwick, Syracuse, Yale, and Chicago. Additionally, I supervise a Yale undergrad student on LArIAT finalizing a pion absorption measurement stemming from my PhD thesis.

Workshops and Teaching:

- 2021 [LArTPCs & FNAL LAr Program](#), Giambiagi Winter School, Argentina, Invited Teacher
- 2021 *NuMI for Beginners*, MicroBooNE Collaboration Wide Workshops
- 2021 *Neutrino Cross Section Extraction*, MicroBooNE Collaboration Wide Workshop
- 2019 *FNAL Neutrino University Summer Series*, Organizer for FNAL
- 2014-2019 *LArSoft, Grid and Data Handling Tutorials*, LArIAT Collaboration Wide Workshops
- 2014-2015 Teaching Fellow, Lab Instructor, Yale University
- 2013-2014 Teaching Fellow, General Physics, Yale University
- 2012-2013 Teaching Fellow for the Fisica t-a (Classical Mechanics for Eng.) class, University of Bologna

COMMUNITY ENGAGEMENT

Invited Expert ECFA 2021
As an invited panelist for the 2021 European Committee for Future Accelerators (ECFA) Detector Roadmap Liquid Detector Symposium (whose final scope is to capture a coherent vision for the European particle physics community), I led the discussion on scintillation light in LAr.

Invited Grant Reviewer DOE 2021
Invited grant reviewer for the U.S. Department of Energy Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, awarding up to \$1,6M in funding annually.

Volunteer for the Mechanical Ventilator Milano FNAL Volunteer 2020
From March to June 2020, I worked on constructing the Mechanical Ventilator Milano (MVM) emergency ventilator (FDA approved in less than 3 months) and start a local community program to sew masks for essential workers in the wake of the COVID-19 emergency. For my work on MVM, Fermilab awarded me a 2020 Exceptional Performance Recognition Award (EPRA).

Climate and Diversity Committee Yale University 2014-2018
I was elected graduate student representative in the physics department advisory committee for women and underrepresented minorities.

FSPA Elected Fellow FNAL 2015-2016
As Fermilab Students and Postdocs Association fellow, I was the head organizer of the 2016 New Perspectives conference and an invited member of the Fermilab User Executive Committee. I also joined the 2016 and 2017 Fermilab delegations to the US Congress. The delegation spoke with US senators, congress people and funding agencies about financial support for high priority projects, resulting in a \$833M US-based appropriation for DUNE.

PUBLIC ENGAGEMENT

The 2020 pandemic and its aftermath have been stark reminders that public trust and public discourse around science have very profound consequences on people's lives and countries' economies. I believe it is every scientist's civil duty to be proactive in the popularization of the inner workings of science, so that public trust is gained not via dogmatic faith, but rather through an understanding available to the whole civil society. As such, I regularly design, train for and participate in physics outreach activities. Here, I list my most relevant activity; more at www.elenagramellini.com/outreach.

2021 Writer, Director and Animator for the movie premiered at FNAL Physics Slam
[*The silent thread – a visceral experience of neutrino sources*](#)

2020 FNAL Volunteer for Chicago Museum of Science and Industry Initiative
Black Creativity Career Showcase

2019 FNAL Reviewer to assess the impact of the *Ask-A-Scientist* initiative

2018-2019 FNAL Family Open House, creator of the activity *The Great Neutrino Hunt*

2019 Speaker for the talk on tap event at the Empty Bottle, Chicago, *Wonder & Skepticism*

2017-2019 Speaker at the TechSavvy initiative for middle school girls in STEM, Triton College

2015-2019 Tour guide for *FNAL Saturday Morning Physics and MicroBooNE*

2017 Alan Alda Center for Scientific Communication Workshop, FNAL, USA

2017 Course on Nuclear Weapon and Related Security Issues, Washington DC, USA

2016 Presenter for Wicked Science "STEM and Girls" initiative USA

2016 Panelist for Discussion with Students from Rwanda, ICHEP, Chicago

ADDITIONAL PROFESSIONAL TRAINING

2005-2006 Professional basketball player, Forlì, Italy