

The National Center for Electron Beam Research at Texas A&M University- Two Decades of Advancing Electron Beam and X-ray Technologies Around the World

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INTERNATIONAL CONFERENCE ON

ACCELERATORS FOR RESEARCH AND SUSTAINABLE DEVELOPMENT

From good practices towards socioeconomic impact



23–27 May 2022

IAEA Headquarters, Vienna, Austria

Texas A&M University



- 2nd Largest University in the US (~ 74,000 students)
 - 267 Masters and Ph.D. programs
 - > 133 undergraduate degree programs
- \$ 1 billion in research expenditures/year
- # 1 US National Science Foundation Ranking for Agricultural & Life Sciences research expenditures among US universities



National Center for Electron Beam Research since 2002



~ 20,000 sq. feet commercial scale/R&D facility

- Dual Modality facility (eBeam and X-ray)

HEEB/HEEX

- High energy eBeam technology
 - (2 10 MeV-15 kW linacs)
- High energy X-Ray technology
 - 5 MeV-15 kW linac

MEEB/MEEX

- 1.9 MeV eBeam/X-ray ("Beams in a Box")
- Research platform- *spring 2023*

LEEB

- EBLAB 200 (80 keV - 200 keV) Low Energy Electron Beam) –

- State of the art Dosimetry System

- Alanine (Gold standard in dosimetry)
- B-3 (GEX) film dosimetry
- Gafchromic film dosimetry
- Risoscan film dosimetry

- Facility registered and inspected by

- FDA, USDA-FSIS, and USDA-APHIS

- ISO compliant

R&D Experience: food, medicine, devices, polymers, environmental, phytosanitary, entomology, basic microbiology and molecular biology, veterinary medicine, space food, vending machine items, etc

Focus –

- peer-reviewed fundamental and translational research
- Ph.D and MS and undergraduate student training in eBeam/X-ray technologies
- Patents
- Proprietary research for industry clients
- Outreach and Education



Commercial Experience: food, phytosanitary, pharmaceuticals, animal feed, pet food, devices, horticulture products, household products



Our Vision

Harnessing eBeam Technology for *Cleaning, Healing, Feeding, and Shaping* this World and Beyond.....

Cleaning : Environmental remediation

Healing: Novel therapeutics

Feeding: Food security and food safety

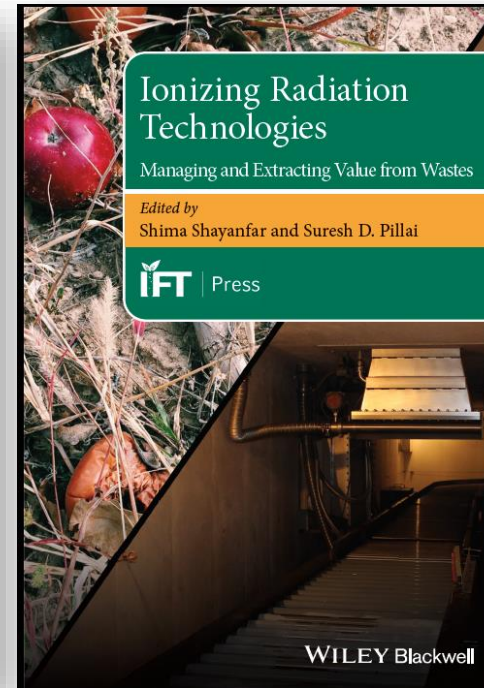
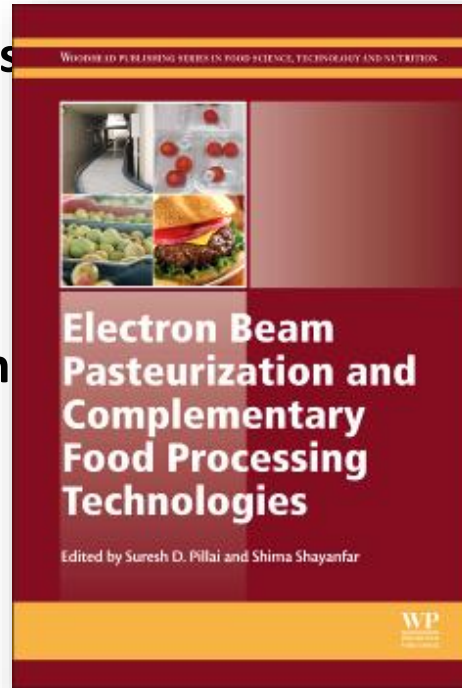
Shaping: Develop bioplastics and novel polymers

..and Beyond: sterilization, disinfection, and materials science solutions for NASA and private US space industry



Our Strategy

- ✓ Peer –reviewed original research articles
- ✓ Books and book chapters
- ✓ Ph.D., Masters, and Undergraduate student training
- ✓ Graduate and undergraduate courses in eBeam technology
- ✓ Partnering to perform technical and financial feasibility analyses
- ✓ Partnering with leading equipment /technology suppliers
- ✓ Hands-on eBeam workshops
- ✓ Outreach activities
- ✓ Engaging entrepreneurs



International Atomic Energy Agency (IAEA) – Atoms for Peace & Development




IAEA
International Atomic Energy Agency

NATIONAL CENTER FOR ELECTRON BEAM RESEARCH
at Texas A&M Agri Life Research

IAEA Collaborating Centre

for
Electron Beam Technology for Food, Health and
Environmental Applications

2014–2017



IAEA
International Atomic Energy Agency

Texas A&M AgriLife Research
National Center for Electron Beam Research

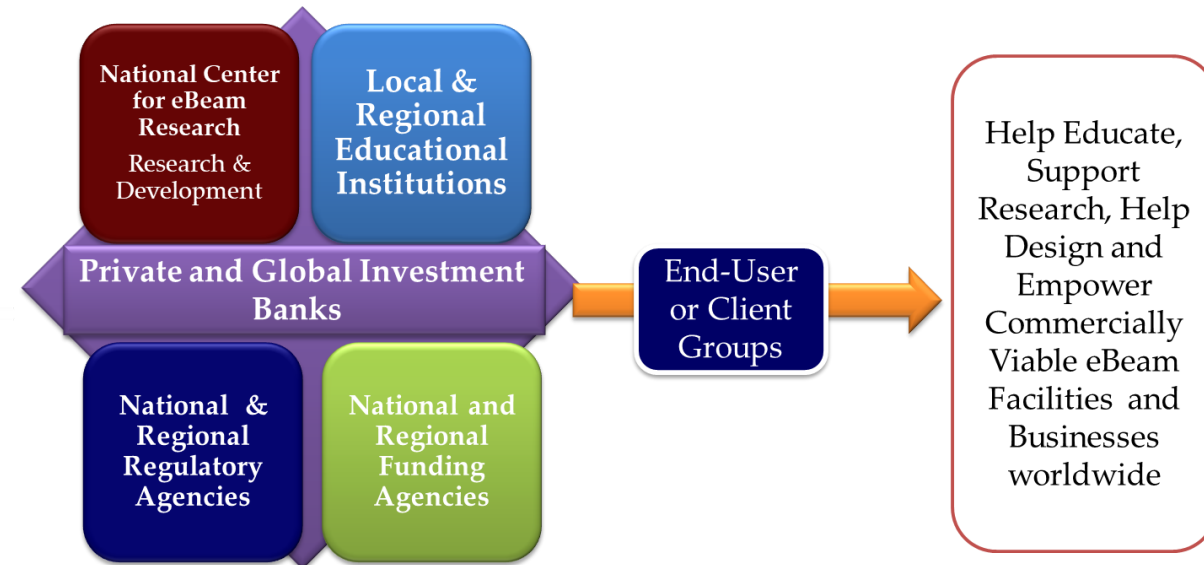
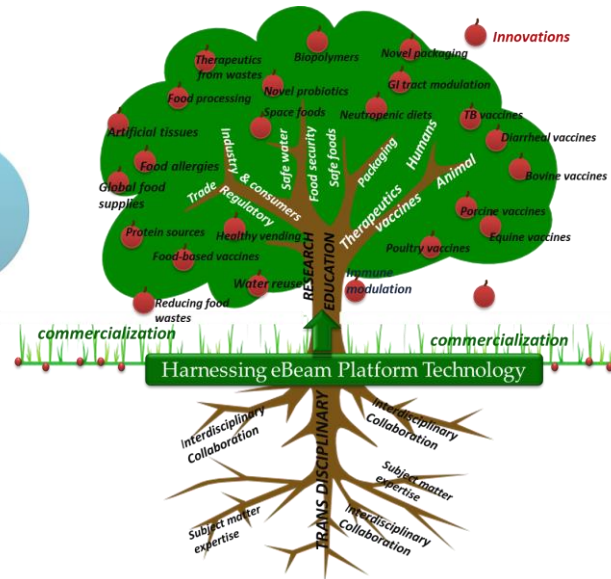
IAEA Collaborating Center

for
Electron Beam Technology for Food, Health
and Environmental Applications

2019 – 2023

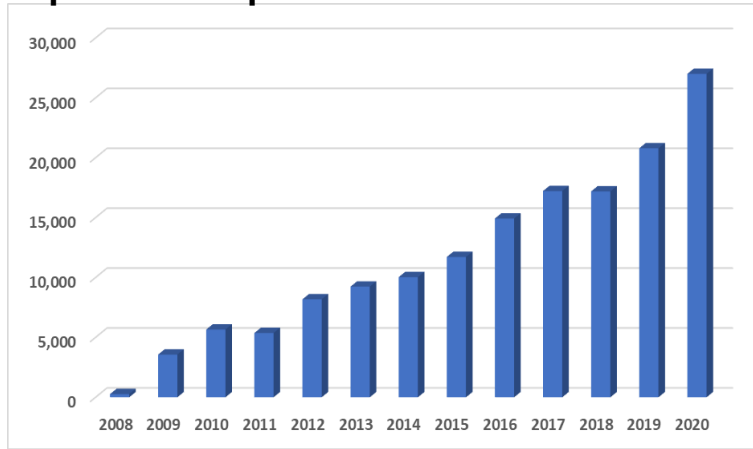


NCEBR's Global Vision



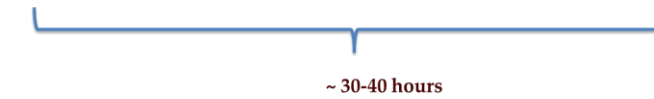
Case Study- Mexico & Pakistan for Advancing eBeam technology

Growth trends in ionizing technology processed fresh produce exports from Mexico to the US



Increasing mango exports from Pakistan to the United States

• Karachi → Dubai → Houston → Texas A&M eBeam facility

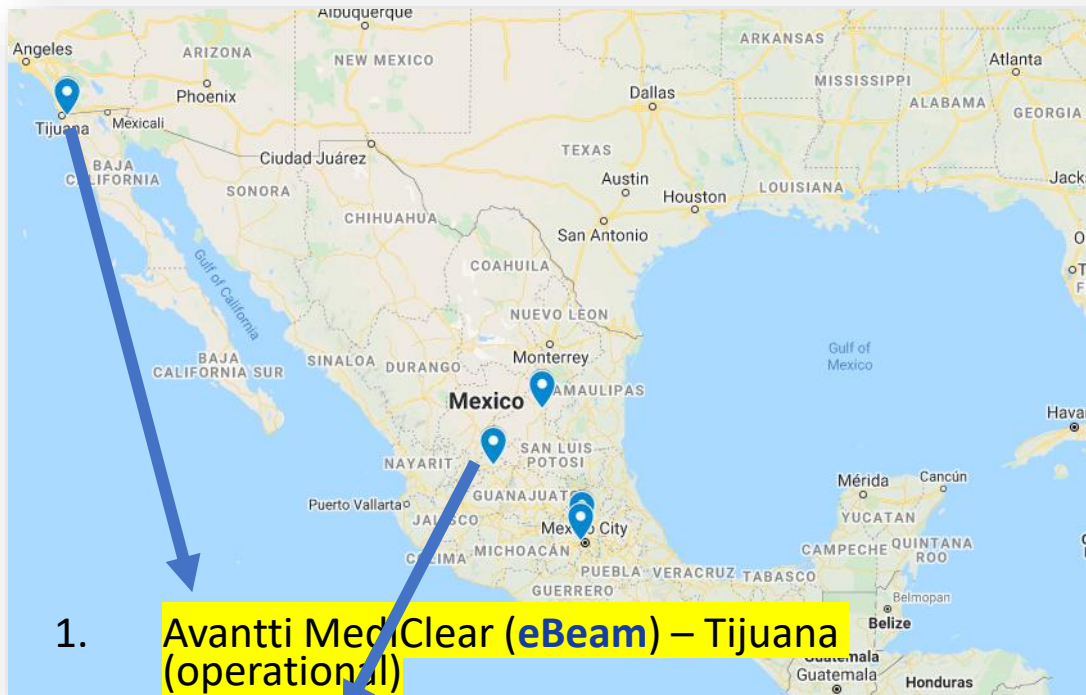


Mexican mangoes: ~ 3,500,000 lbs of Mexican mangoes treated in 3 months



Advancing eBeam and X-ray Technologies Around the World

Mexico



1. Avantti MedClear (eBeam) – Tijuana (operational)
2. E-AGRO Industrial – (Ebeam/X-ray)-Aguascalientes (under construction)

Pakistan



1. Pak eBeam (Karachi) – operational for ~ 3 years
2. ATCOP eBeam facility (Lahore)-under construction

Thank you!

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