NSF Centers that Catalyzed Extraordinary Engineering Impacts on Society

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Mechanical Engineering Department

Virtual Symposium
August 18th – 19th, 2022

The University of Texas Rio Grande Valley

My Engineering Pathway

Engineering has opportunities and pays well

Mechanical engineering is for men

“Go to a place where you can make a difference”

Se **SOLICITA** Gerente Operativo

REQUISITOS:

Sexo: Masculino

Edad: 30-50 años

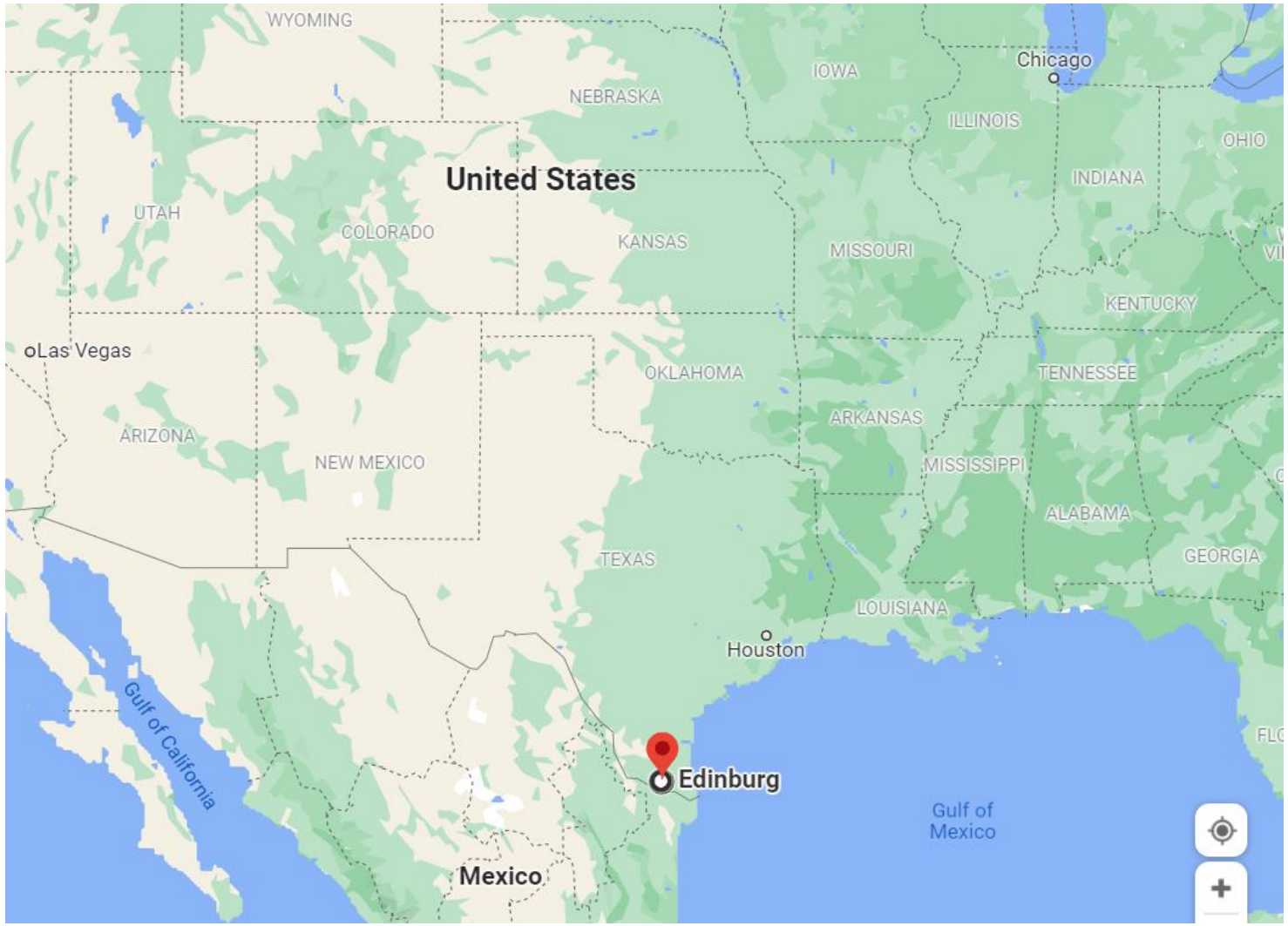
Estado Civil: Casado

Escolaridad: **Ingeniero Mecánico**

Sex: Male
Age: 25 to 50 yrs old
Civil status: Married
Mechanical Engineer

Ofrecemos atractivo sueldo y prestaciones de ley

Finding the right place



UTRGV:

- 31,939 students, 91% Hispanic
- 92% local students (RGV)
- 55% 1st generation
- Average entry ACT 19
- 1st yr retention rate 75% (Full Time)
- 6th yr grad rate 55%
- 78% financial aid, 60% Pell grants

The Rio Grande Valley area:

- 440k students / 37 school districts
- 97% Hispanics, >50% at risk
- Standardized scores < State avg
- 148th/150 Metro areas in education*

*https://www.forbes.com/sites/michaeltnietzel/2021/07/19/wallethubs-most-and-least-educated-american-cities/?sh=433c9fc172d6

Data from Science and Engineering Indicators on female and URM in Engineering

- The gender gap in engineering degrees has remained steady for the last 30 years (about 80/20)
- URM has slightly increased

B.S. degrees in 2008 & 2018 as per NSB Indicators 2020

% of Students	Male		Female		Hisp	Male	Hisp	Female
	08	18	08	18	08	18	08	18
ALL	43	43	57	57	3	5	5	8
S&E degrees	44	42	56	58	3	5	5	8
Science	39	37	61	63	3	5	5	9
Engr	81	78	19	22	6	8	2	3
Mech Engr	88	86	12	14	6	9	1	2

MS/PhD degrees awarded in 2018 per NSB Indicators 2020

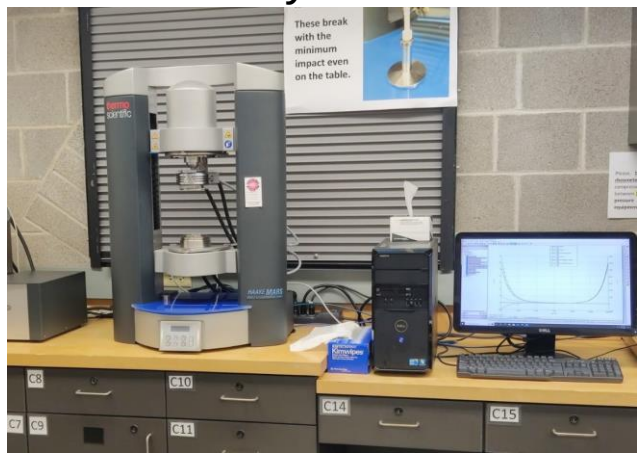
% of Students	Male		Female		Hisp	Male	Hisp	Female
	MS	PhD	MS	PhD	MS	PhD	MS	PhD
ALL	40	54	60	46	3	2	6	2
S&E Degrees	43	58	57	42	3	2	5	2
Science	36	52	64	48	2	2	5	3
Engr	74	76	26	24	3	2	1	1
Mech Engr	86	86	14	14	4	X	1	X

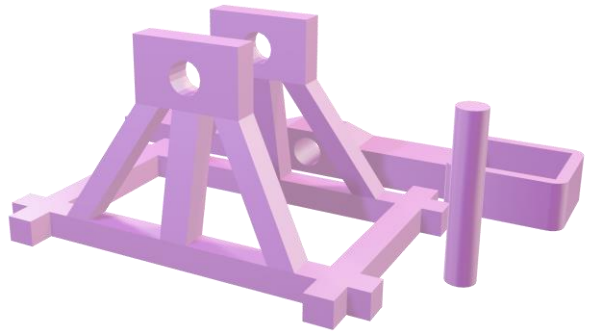
There is an imperative need to further ENGAGE Women and URM in Engineering

The RGV is an area with vast potential

NSF investments that contributed to catalyze engineering impacts in research and education:

MRI grant (CMMI 0078990 09/20-08/02): Perfect platform to attract funding; hundreds of HS, UG, MS and PhD students have directly benefitted from the instrumentation.





CAREER award (CMS 0092621 09/01-08/06), the **NanoTeam** was created, a formal Engineering research movement started at UTPA, a “research team” was formed. Active learning experiences prompted students to be positively engaged with their academic careers.

NER (CMMI 0404306), NIRT (CMMI 0609345), Unsolicited Polymer (DMR 0606224)

UG Research opportunities were offered Fall/Spring semesters (10-20 hrs/wk) and Summers (40 hrs/wk)

Partnership for Research and Education in Materials Science (UTRGV-UMN)

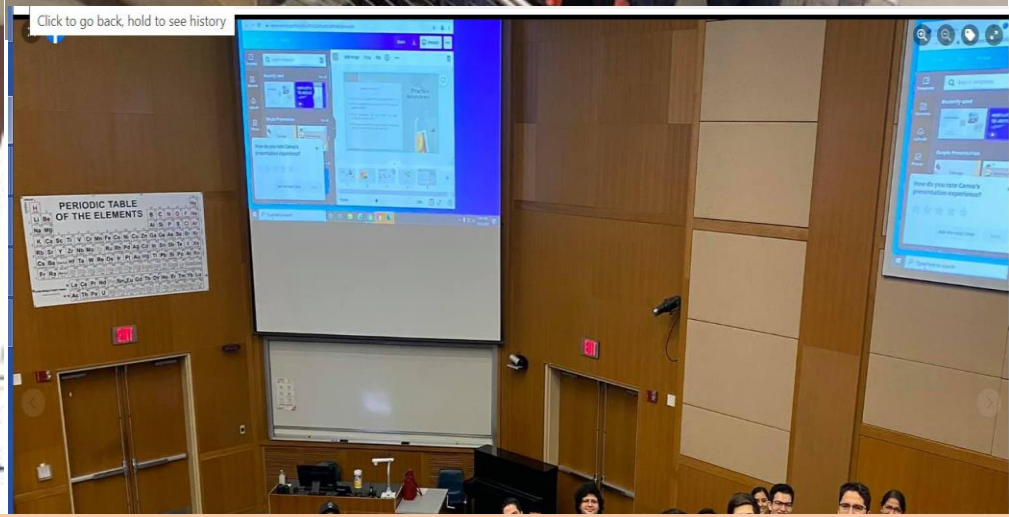
PREM Award	Dates	UG students	MS students	Female % UG/MS	URM % UG/MS	Publications	Pat/pat applications	Presentations	Graduate school %
DMR 0934157	09-14	116	19	26 / 21	92 / 47	77	12	125	43
DMR 1523577	15-NCE	113	54	32 / 28	93 / 76	125	8	262	51
DMR	21-	43	13	49 / 46	95 / 38	12		17	88

The NanoTeam has achieved 100% retention & graduation!

PREM offers:

- Sense of belonging
- Holistic development, pathway to success
- Clarification of educ/career goals, adaptive expertise
- Work experience, builds resumes (research articles, conferences, and participation in outreach programs).
- PREM teaches soft skills

PREM has created a culture of achievement, where those who might lack drive, discipline, and/or knowledge of opportunities, conform to the norms and standards of the team, thereby discovering their potential and inner talents

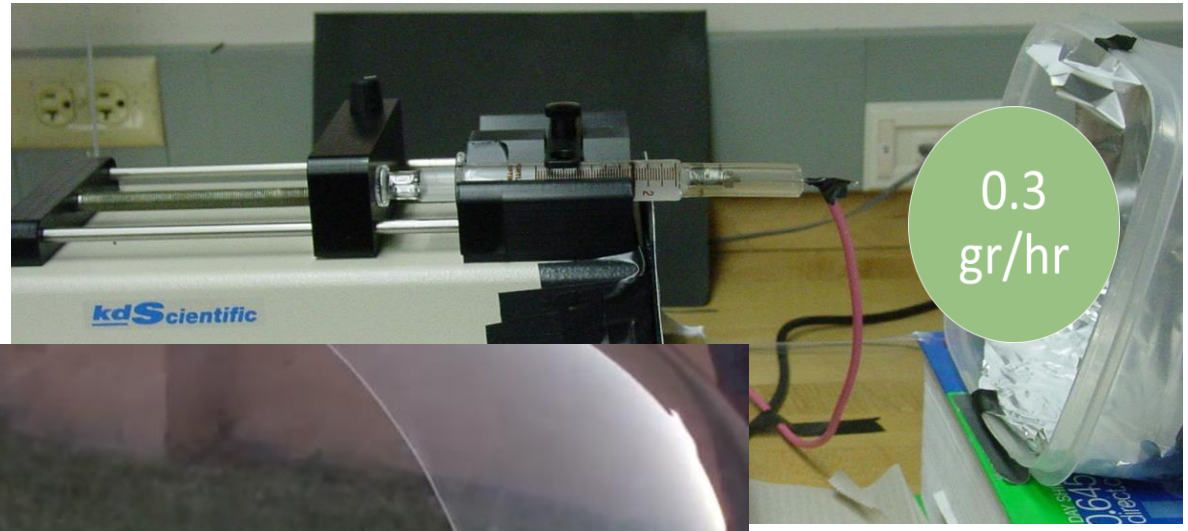


KEY Research projects have to be strategically designed

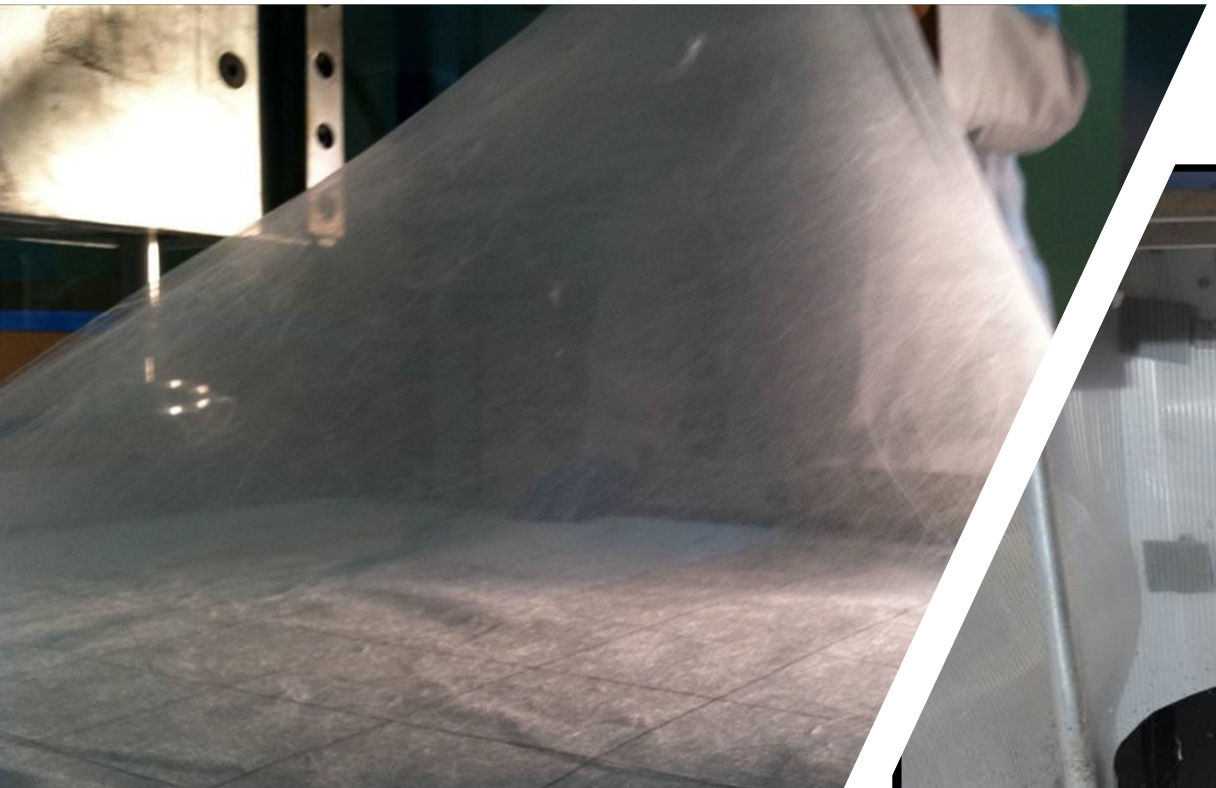
- Lead to significant contributions to the body of scientific knowledge
- Be feasible for UG students to make important contributions within their boundary conditions

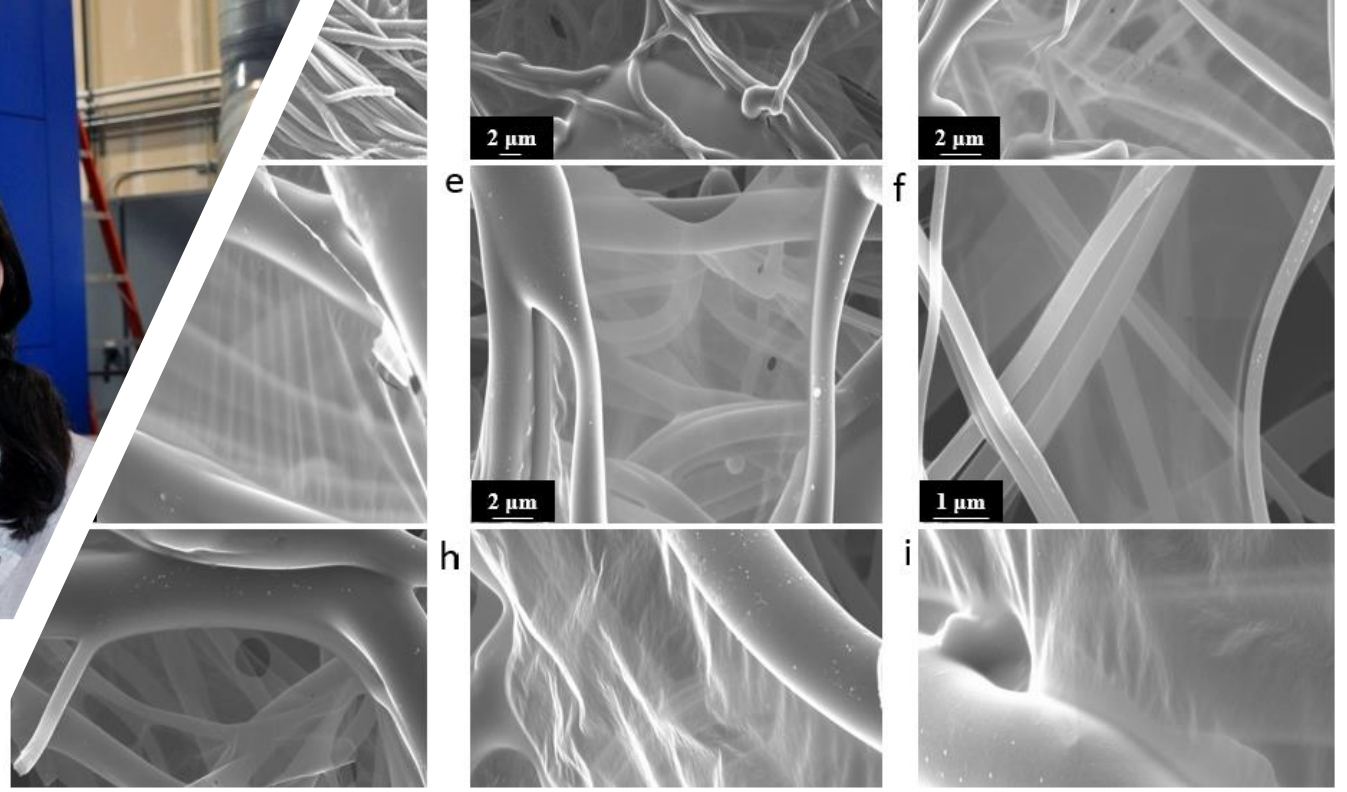
Engineering research projects

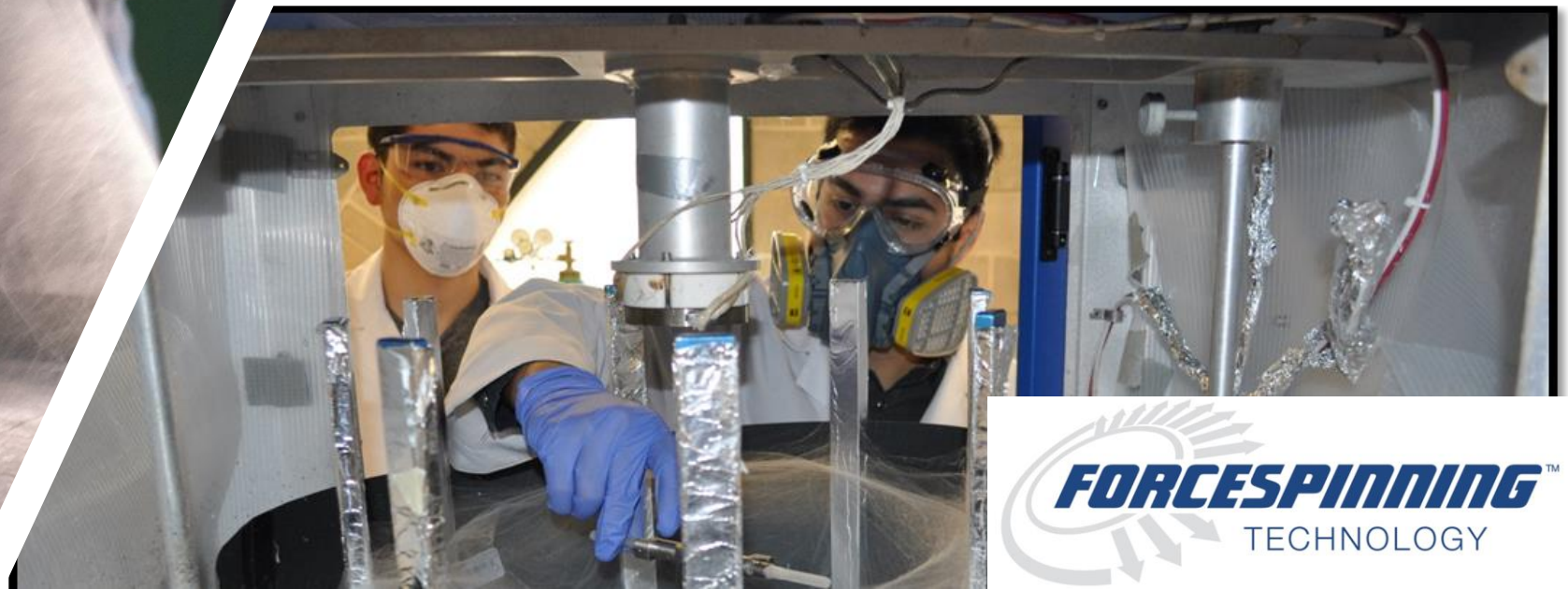
Nanofibers, abundant opportunities for research and commercial applications. Used in filtration, smart materials, tissue engineering, drug delivery, cancer diagnosis, batteries, and overall, in composite materials.



FIBERIO TECHNOLOGIES, INC







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FibeRio Technology named in Global Cleantech 100

FibeRio Technology Corporation, the developer and manufacturer of Forcespinning nanofibre production systems, has been named in the prestigious 2013 Global...

FibeRio's Forcespinning technology is capable of both melt and solution spinning nanofibres.

Textile World

Textile World | Textile News

FibeRio Wins R&D 100 Award For Cyclone™ L-1000, Launches Cyclone L-1000M/D

July 12, 2011

Edinburg, Texas-based FibeRio Technology Corp. — a company created to commercialize Forcespinning™
Technology, which uses centrifugal force to spin nanofibers, nanowires and nanorods — has won a
R&D 100 Award from R&D Magazine for its development and launch of the Cyclone™ L-1000
series of nanofiber production machinery. The annual R&D 100 Awards recognize the 100

OUTREACH











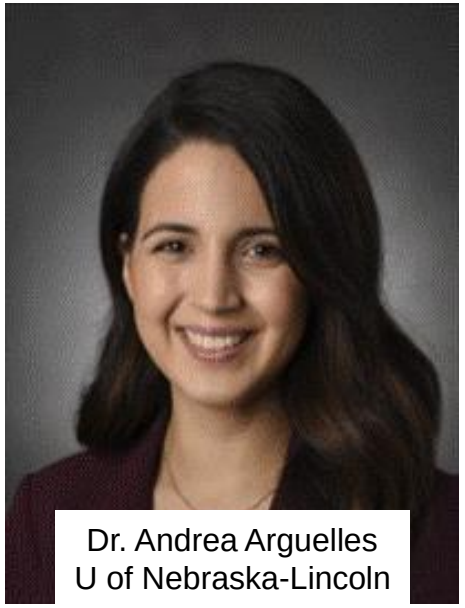


Centers that Catalyzed Extraordinary Engineering Impacts on Society

Can me measure the impact?

- NSF Investment in our Center over the last 23 years has been approximately 20 M
- 100% retention and graduation
- 40-55% 6th year graduation rate
- Several hundred students have pursued MS degrees and 45 PhD degrees, nationwide statistics have for Hispanics, MS and PhD degrees in Engineering 3 and 2% for males, and 1 and 1% for female (Indicators 2020). For Mechanical Engineering, MS 4 and 1% for men and female, no indicators found for PhD level

Dr. Glendimar Molero
Texas A&M



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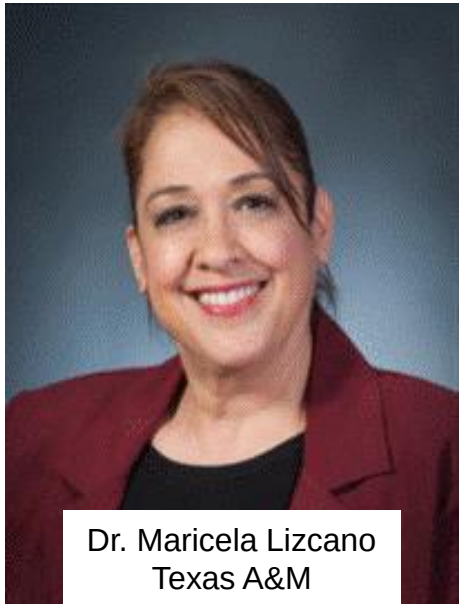

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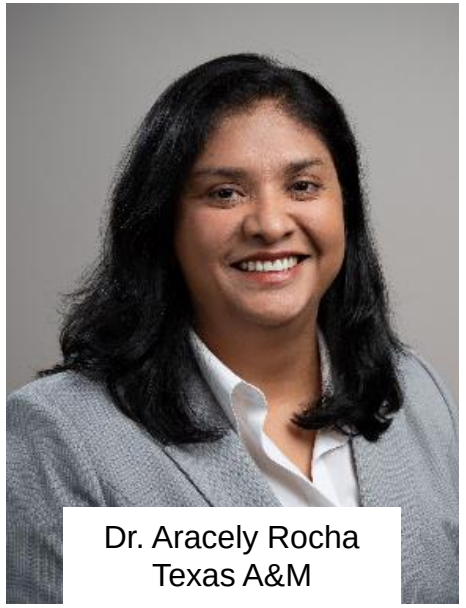

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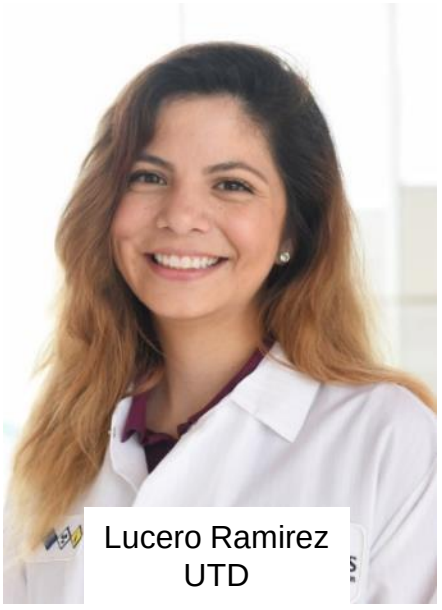

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- Collectively, NSF investment has resulted in students from the NanoTeam earning >40,000,000/year
- Price in Societal impact, PRICELESS

We are ready to explore bigger and better opportunities to further catalyze engineering impacts on society

Acknowledgments:

National Science Foundation
WHERE DISCOVERIES BEGIN

NATIONAL ACADEMY OF ENGINEERING Committee on Extraordinary Engineering Impacts on Society

ALL wonderful students, colleagues, staff and administrators at UTPA-UTRGV that have participated in our once “naive” vision!!!

“Go to a place where you can make a difference”

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