NRT-UtB: University of South Dakota Neuroscience, Nanotechnology and Networks (USD-N3)
Theme and Vision

Theme
Development and application of bio and nanotechnology-based tools in order to better understand the function of and develop treatments for the brain.

Vision
Interdisciplinary training of graduate students using a team-based approach so that students learn how to work and communicate within a team to reach scientific goals, skills that will serve them in both academic and non-academic careers.

https://www.usd.edu/usdn3
Goals

NRT Goals

1. **Interdisciplinary Research:** To develop novel, nanotechnology and bioinformatics-based tools for exploration of the brain.

2. **Professional Skills Training:** The creation of “Micro-credentials/Micro-tracks”, 2-4 course sequences that will provide professional development in a variety of fields including: Accounting & Finance, Analytics, Communication, Entrepreneurship, Health Services Administration, Leadership Communications, Marketing, Teaching, and Technology Transfer.

3. **Professional Development:** a. Workshops by speakers from different STEM career paths and b. Internship opportunities for a variety of careers including analytics, biotechnology, public policy, entrepreneurship, and scientific writing.

[https://www.usd.edu/usdn3](https://www.usd.edu/usdn3)
Microcredentials

2-4 class sequences that will develop non-STEM-specific professional skills to enhance the success of trainees in their different career paths.

**Accounting & Finance**
- Foundations of Accounting (3cr) ACCT 520
- Foundations of Finance (3cr) BADM 505

**Analytics**
- Quantitative Analysis (3cr) BADM 720
- Data Mining for Managers (3cr) BADM 724

**Entrepreneurship**
- New Venture Planning & Development (3cr) ENTR 581
- New Venture Creation (3cr) ENTR 582

**Health Services Administration**
- Advanced Strategic Management of Health Care Organizations (3cr) HSAD 710
- Advanced Health Care Management (3cr) HSAD 770

**Leadership Communications**
- Foundations of Marketing & Organizational Behavior (3cr) BADM 580
- Leadership Development (3cr) BADM 761

**Marketing**
- Foundations of Marketing and Organizational Behavior (3cr) BADM 580
- New Product Development (3cr) MKTG 772
Microcredentials

2-4 class sequences that will develop non-STEM-specific professional skills to enhance the success of trainees in their different career paths

**Communication**
- Environmental Communication (3cr) SPCM 518
- Health Communication (3cr) SPCM 540

**Technology Transfer Primary**
- Introduction to intellectual Law (2-3cr) LAW 860
- Patent Law (2cr) LAW 861

**Teaching**
- Adult Education (3cr) AHED 701
- Curricula, Teaching & Research in Higher Education (3cr) AHED 751

**Communication**
- Communication & Conflict Resolution (3cr) SPCM 585
- Team Building & Group Decision Making (3cr) SPCM 587
- Science Communication (3cr) BME 715

**Technology Transfer Secondary**
- Business Organization (1 to 4 cr) LAW 801
- Administrative Law (2-3cr) LAW 805
- Antitrust Law/Constitutional Protection (2cr) LAW 859

**Teaching**
- Seminar in College Teaching (3cr) AHEAD 882
- Emerging Technology Teaching (3cr) TET 732
Stackable credentials

- Micro-credential
- Graduate Certificate*
- Graduate Degree**

* Select graduate certificates available now
** Development of PSM like M.S. Programs
Timeline for Student Training

- **Year 1**: Core STEM Courses
- **Year 2**: Elective STEM Courses, Microtracks 1 & 2, Internships
- **Year 3**: The Professionals Workshop
- **Year 4**: Neuroscience/Nanotechnology Research
- **Year 5**: (No specific courses listed)
Lessons Learned

• Interdisciplinary Research takes Time to Develop!
  • Interdisciplinary research provides new directions and opportunities (the program has brought together faculty researchers that did not previously work together). However, different “laboratory cultures” and “languages” pose communication challenges.

• Reiterate Communicate Program Expectations to Graduate Students and Advisors!
  • The Trainees believed the additional requirements for the program were beneficial to broaden their knowledge base, yet these pose challenges in time management.
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Inputs
- Supported students perform projects in both materials chemistry/bioinformatics & neuroscience laboratories.

- Professionals Workshops
- myIDP
- Career Counseling

- Introduction to Neurobiology
- Synthesis of Nanomaterials
- Adv. Organic Chemistry
- Cellular & Molecular Biology

Activities
- Accounting and Finance
- Adult and Higher Education
- Communication
- Data Management & Analytics
- Entrepreneurship
- Health Administration
- Leadership Communications
- Marketing
- Technology Transfer

Year 1 Year 2 Year 3 Year 4 Year 5

Interdisciplinary Research

Professional Development Program

STEM Courses

Microtracks/credentials

Internships

Outcomes
- New tools to study and treat the brain
- Better training of STEM grad students for careers in public, private & academic sectors
- Enhance diversity of graduate STEM programs & workforce

Inputs

Impacts

Activities

Outcomes