NUCATS 2.0
NUCATS 1.0 Overview

• Inaugurated 2007, directed by Phil Greenland
• CTSA award in 2008; through April 30, 2013
• Structured around 5 centers
  – Center for Translational Innovation
  – Northwestern University Biomedical Informatics Center
  – Center for Clinical Research
  – Community-Engaged Research Center
  – Center for Education and Career Development
NUCATS 1.0
Accomplishments

Accelerating progress in
- Infrastructure creation
- Pilot funding/pipeline development
- Clinical trials support
- Community research capacity
- Expanded training/career development
- Team Science
NUCATS 2.0 and CTSA Renewal

- Opportunity to re-position NUCATS in FSM and more broadly for NU
  - Capacity built, focus more on service
  - Create more horizontal, integrated functions rather than vertical silos
  - Enhanced marketing to make NU/NM community more aware of all resources and services
  - New membership model allows greater assistance, engagement and tracking
  - Facilitate translation and movement through the clinical and translational pipeline
NUCATS 2.0 Mission and Vision

• **Mission:** Speeding transformative research discoveries to patients and the population

• **Vision:** Transform NUCATS into a national model of a highly integrated academic nexus that continually increases the quality, safety, efficiency and speed of innovative clinical and translational research

• **3 Global Aims/Strategies:** Integration, Innovation, Collaboration
NUCATS 2.0 Summary

Speeding transformative research discoveries to patients and the population

• Integration
  – Fewer silos within and beyond NU
  – Human-curated, informatics-based research navigation
    • Connect investigators and research teams to funding, collaborators, resources and services to speed their work

• Innovation
  – New solutions to research barriers
  – Emphasis on metrics and quality improvement

• Collaboration
  – Team Science for all
  – More outreach to rest of NU and Clinical Partners
  – More collaboration across CTSAs
NUCATS 2.0 Participating Institutions
NUCATS 2.0 Integration, Informatics and Infrastructure
NUCATS 2.0: Human-curated, informatics-based navigation
Integrated Informatics Infrastructure

**Research-Specific Systems**
- LatticeGRID*
- NU Scholars
- Protocol Authoring Tools
- NUCATS Assist*
- I2B2
- FacultyConnect*
- RegiStar *
- eNOTIS* (CTMS)
- REDCap
- Surveyor*
- SAMPLE* (Biobank)
- Patient Study Calendar* (PSC)
- **Budget Development Tools**
- eSPRV* (Research Billing)
- FISMA Support
- clearcats*
- CTOT*

**Research Sequence**
- Team Building
- Hypothesis Development
- Protocol Development
- Feasibility
- Funding
- Recruitment
- Enrollment
- Data & Sample Collection
- Monitoring
- Billing
- Data Management & Analysis
- Dissemination

**Clinical and Mixed-use Systems**
- NMEDW*
- MyResearch*
- Custom CDSS
- EHR
- Revenue Cycle

**Electronic IRB System**
- Electronic IRB System

**NUCATS**
Clinical and Translational Sciences Institute
Northwestern Medicine Enterprise Data Warehouse

• Founding Members
  • NU/FSM
  • Northwestern Memorial Health Care
  • Northwestern Medical Faculty Foundation

• Onboarding Members
  • Rehabilitation Institute of Chicago
  • Lurie Children’s Hospital

• Supports both research and clinical care
• Mature Governance Model
• Data on 2.1M patients
NUCATS 2.0 Discovery and Pre-Clinical Initiatives
Innovation Accelerator Program

- Includes the investigator and possibly post-doc(s) affiliated with the project
- Volunteers through Chicago Innovation Mentors

- Innovator
- Mentors
- Investor and Industry Partners
- Technology Development Experts

- Project prioritization
- Early Stage Pilot Fund review
- Guide milestones
- Andrew Mazar
- Maryam Saleh
- New EIR (diagnostics)
DRUG DISCOVERY

- Concept/ID Target
  - Lymphoma Therapy (Gordon)
  - EGR2 Signaling: Fibrosis (Fang)
  - Non-Steroidal Progestrone Agonist: Fibroids (Bulun)
  - NUSD3: Endometriosis (Bulun)
  - RERG: Endometriosis (Bulun)
  - Hepatocellular CA (Silverman)
  - Human Melanoma (Silverman)
  - Anti-CA Drug Delivery (MesserSmith)
  - Laminin Target: Wound Healing & Tumorigenesis (Jones)

- Identify & Validate Target
  - ALS Compounds (Siddique)
  - HCN Inhibitor: Depression (Chetkovich)
  - Andrographolide: Lymphoma (Gordon)
  - GLUT Antagonists: CA (Shanmugam)
  - Zn Trafficking: ID (O’Halloran & Mazar)
  - uPA/uPAR Cytotoxics: ADC (Mazar, Jewett, ImQuest)
  - Glutamine-Targeted Agents: CA (Chandals)
  - FFR-2 & -3 Targets: Diabetes (Layden)
  - CCXR4 Chemosensitizers (Miller, ChemCore)
  - Nucleoside Analogues (Rosen, ChemCore)
  - PAI-1 Inhibitors: Thromboembolic Disease, PCOS, Alopecia (Vaughan)
  - uPA & uPAR Targeting Au NP: CA (Mirkin: Aurasense)
  - uPA/uPAR: Targeted Tumor Therapy (O’Halloran; Valence Therapeutics)

- Identify Lead Molecules
  - Fe NPs (Dravid)
  - AHG2: Peanut Allergy (Schleimer)
  - Fe Chelators: IF (Kamp)
  - MIF-Conjugated Delivery: Chemotherapy (Henkin)
  - Gene Therapy: Atrial Fibrillation (Arora)
  - NOS Target: Neurodegeneration (Silverman)
  - Cell Cycle Inhibitors: Breast CA (Jeurus)
  - PNC Marker: Metastasis (Huang)
  - RH0: Hearing Loss (Richter)
  - Peptide Vaccine: PancreaticCA (Kharzai)
  - GSK-3 Inhibitors: CA (Mazar & Ugolkov)
  - Maspin: Bone Disorders (Zhang)
  - PYTs: Parkinson’s Disease (Silverman & Surmeier)
  - Compound A: Androgen Dependent Disease (Budinova)
  - Compound E: Alzheimer’s (Binder; Intellect Neuroscience & Unnamed Company)
  - ATN: 201-NB: Glcoma (O’Halloran; Valence Therapeutics)
  - Neuroprotective Therapy (Liu; Renu)
  - Scleroderma Therapy (Varga; BioLineRx)

- Optimize Lead Molecules
  - Chronic Pelvic Pain (Klumpp & Schaeffer)
  - KBU2046: Prostate CA & Metastasis (Scheidt & Bergan)
  - Gold Nanostars: CA (Odd)
  - Photodynamic CA Therapy (Hoffman)
  - Apoptosis Imaging: CV (Zhao)

- Predclinical Trials
  - Nucleoside Analog: Heme CA (O’Halloran; Valence Therapeutics)
  - huATN-658: CA, Metastasis, RA (Mazar; Tactic)
  - Antisense Molecules: Sarring (Mustoe; Pfizer)
  - GLYX-13: Depression & Pain (Moskal; Naurex)
  - TT-301: Arthritis & Alzheimer (Watterson; Transition Therapeutics)

- Clinical Trials
  - Isradipine: Parkinson’s Disease (Surmeier)

- Approval & Marketing
  - Lyrica™: Fibromyalgia (Silverman; Pfizer)

Licensing Status
- Non-Licensed
- In Negotiations
- Licensed
# Medical Devices & Healthcare Software

## Concept
- Electromagnetic Therapy (Reed)
- Catheter for Gene Therapy (Arora)
- RF Ablation Probe (Mahvi & McCarthy)
- IVC Filter Removal (Resnick)
- Smart Uretal Stent (McVary, Le, Colombio)
- Visual Interface for EHRs (Leibowitz & Naidech)
- Passive Subcutaneous Glucose Sensor (Zhang)
- Continence Device (Mahvi & McCarthy)
- Left Atrial Appendage Occluder (Lee; Cook)
- Mammary Prosthesis (Kim; Mentor Worldwide)

## Laboratory Prototype
- 2nd Trimester Uterine Model (York)
- Optical Stimulation of Cochlear Implant (Richter)
- Fluoroscopy Simulator (Soper)
- Penile Prosthesis (Colombo)
- Shape & Compliance Detection from Hair Cells (Hartmann)
- Flow & Pressure Sensors, MEMS (Liu)
- Pressure Sensor for CPAP Device (Liu)
- TurboTax for Compliance of EHRs (Kho)
- Intracranial Pressure Control System (Raman)
- Smartphone App: Depression Management (Mohr)
- Retinal Vessel Segmentation (Zhang)
- Chamber for In Situ Wound Healing (Gallano)
- AF Peak Detection (Ng)
- MRE Passive Driver (Carroll)
- User Interface for Hearing Aid Adjustment (Sabin; Ear Machine)
- OR Supervision Assessment System (DaRosa & George; CAE Healthcare)

## Commercial Prototype
- Adhesives for Filters (Pall)
- Biosensors (Meade; Ohmx)
- Perfusion Devices (Ameer; ProSorp)
- Quantification of Cerebral Perfusion (Carroll; Siemens)
- Hearing Test (Kraus; Fisher Behavioral)
- Vocal Cord Medialization (Siegel & Lim; Cook)
- Smartphone App: Help Parents Transition from NICU to Home (Garfield; Motorola)
- Flexible Electronic Medical Device (Huang; MC10)
- Motorized Software-Controlled Calibrator for Acoustic Probes (Sieg & Dhar; Etymotic Research)

## Human Testing
- Cancer Diagnostics (Backman; American BioOptics)
- HIV Diagnostics (Kelso; NGHF)
- Medical Adhesives (Messersmith; Kensey Nash)
- Vascular Disease (Ameer; VesselTek)
- Rehab Robotics (Dewald; Deward Robotics)

## Approval & Marketing
- Cement Mixer (Lautenschlager; Stryker)
- Rehab Devices (Peshkin & Colgate; HDT)

## Licensing Status
- Non-Licensed
- In Negotiations
- Licensed
NUCATS 2.0 Clinical and Patient-Centered Initiatives
NUCATS 2.0 Community and Consortium Initiatives
Uniqueness of NU CEnR

- Leadership in the Chicago Consortium for Community Engagement (C3)
- Collaboration with over 200 community organizations & healthcare practices
- Reach into an incredibly diverse Chicago population
- Support of more than 60 faculty members in the Center for Community Health
Community Engagement
“Portfolio Management”

- Deploy, innovate, & evaluate under NUCATS
- Sustain “best practices” with new grants & NU commitment
NUCATS 2.0 Education and Career Development
### Education and Career Development Programs

#### Graduate Programs
- Master of Science in Clinical Investigation
- Master of Science in Research Compliance
- Health Sciences Integrated PhD Program
- MSCI/DGP Dual Degree Program
- Graduate Certificate in Clinical and Translational Science

#### Investigator Education Programs
- Navigating the Translational Research Enterprise
- K Scholar Peer Mentoring
- RCR
- M1 Research Training
- Grant Writers Groups
- Mock Study Sections
- Comprehensive K Scholar Training

#### Mentoring Programs
- Mentor Training for Faculty (Evanston Campus)
- Mentor Training for K Scholars (Chicago Campus)
- Promoting Inner-city Youth in Science and Medicine (PRISM)
- Mentoring Consultation Service

#### Research Staff Programs
- Clinical Research Coordinator (CRC) Basic Training
- Clinical Research Compliance Courses
- Essentials of Initiating Clinical Research (licensure only)
- Education and Training Services

#### Career Development Programs
- KL2
- TL1
- Physician Scientist Training Program

*Red Text = NEW NUCATS 2.0 Initiatives*
NUCATS 2.0
Team Science
Collaboration: Team Catalyzer System

- Uses a mix of informatics-based and empirically-informed digital and human resources to match, cultivate, and ensure the success of teams in practice
  - LatticeGrid & Northwestern Scholars
  - Learning from tracking Navigator hand-offs and activities
  - NU-based knowledge in complex systems and social network science: Spring, Uzzi, Contractor
  - C&T research “studios” address focal problems faced by science teams
Collaboration: Training C&T Researchers

- Expanded MSCI activities
  - New certificate program for basic pre-doctoral students; combined MSCI/PhD program; new HSIP
- Expanded MSRC
  - 3 tracks in clinical research, quality systems and healthcare compliance
- Expanded career development activities
  - Institutional mentor training program; comprehensive and integrated educational and career development training programs for all K scholars; novel Education Consultation Service to assist with the design, implementation, integration and evaluation of training programs across NUCATS
- Focus on enhanced diversity
NUCATS 2.0: Making it Fly

• Organized around integrated, cross-cutting Operations Teams
  – Integration and Infrastructure
  – Discovery and Pre-Clinical
  – Clinical and Patient-Centered
  – Population Health and Dissemination
  – Education and Career Development
NUCATS 2.0

http://www.nucats.northwestern.edu/

...or Google “NUCATS”