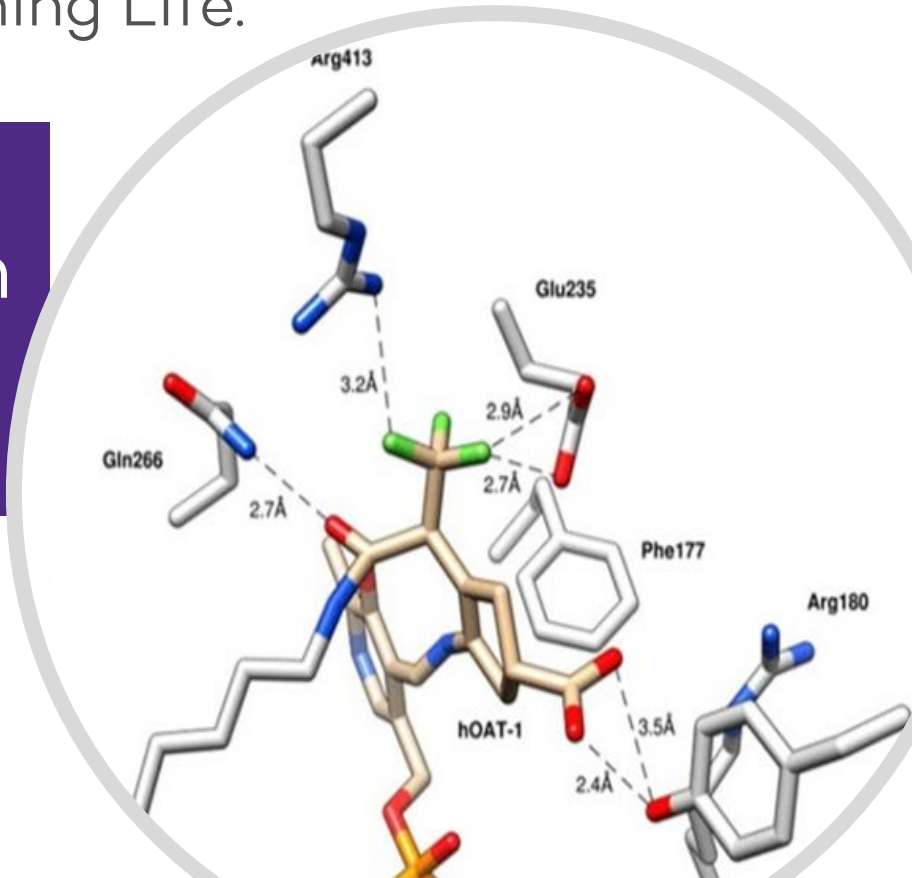
The Chemistry of Life Processes Institute at Northwestern University

Transforming Science. Transforming Life.

5 Year Strategic Plan 2022-2026



Northwestern | Chemistry of Life Processes Institute

CLP Director's Message

I am very pleased to share the Chemistry of Life Processes Institute's 2022-2027 Strategic Plan. Since the Institute's inception in 2005, our pioneering faculty and research staff have been at the forefront of biomedical discovery, addressing urgent clinical needs and bringing new therapies, diagnostic tools, and other biomedical breakthroughs to the marketplace.

This promises to be an exciting and high-impact period in the life of the Institute. I will continue to rely on our faculty advisors, operations team, Executive Advisory Board, and other important stakeholders to carry out the Institute's mission to develop new cross-cutting research programs, train and educate a diverse cohort of world-class researchers, and translate game-changing innovations for the benefit of society.

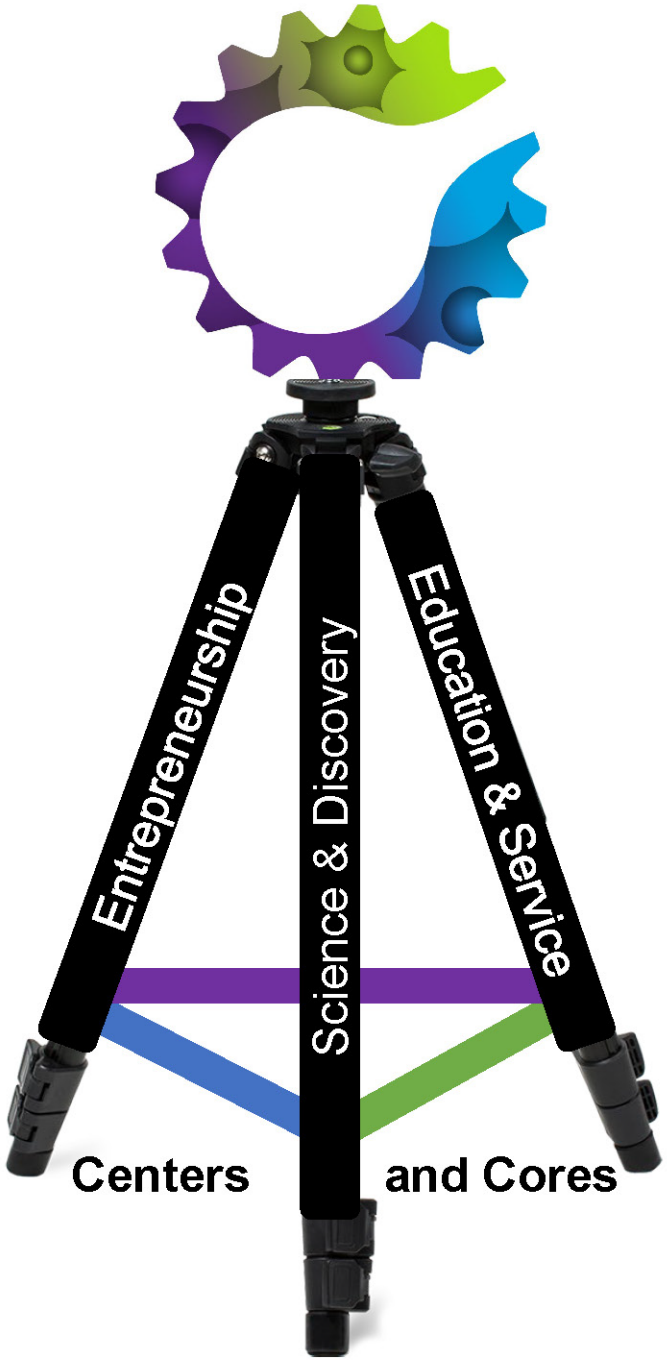
Looking ahead, CLP will continue to provide fertile ground and the resources necessary for blue-sky, transdisciplinary research to thrive. We will remain a vibrant destination for entrepreneurial and collaborative faculty to bring new cures and new hope for a healthier future for all.

CLP 2.0 Vision

Transform Science. Transform Life

CLP increases our understanding of the molecular foundations of health and disease.

CLP creates new therapeutics and diagnostics that address urgent clinical needs by converging medicine with chemistry, biology and engineering.



Our Mission for 2026

- The Chemistry of Life Processes Institute will lead Northwestern University to new prominence in the development of molecular therapeutics and diagnostics.
- We will achieve success through focused convergence of chemistry and medicine, translation of new technologies, and fostering faculty entrepreneurship.
- We will integrate research with training of a diverse cohort of world class researchers to work across the chemistry:biology interface to develop creative approaches to understanding health and treating disease.

CLP's Unique Role at Northwestern

- ✓ CLP is the only NU site for **small molecule-based drug development.**
- ✓ CLP is the focus of NU **preclinical translation** activities ranging from high throughput screening, preclinical testing, and optimization of new diagnostics.
- ✓ CLP has a record of driving **major interdisciplinary biomedical research grant awards:** PSOC U54, NU GoKidney NIDDK P30, Lurie Cancer Center P30.
- ✓ CLP has the only **predoctoral training program at the interface of chemistry and biology.**

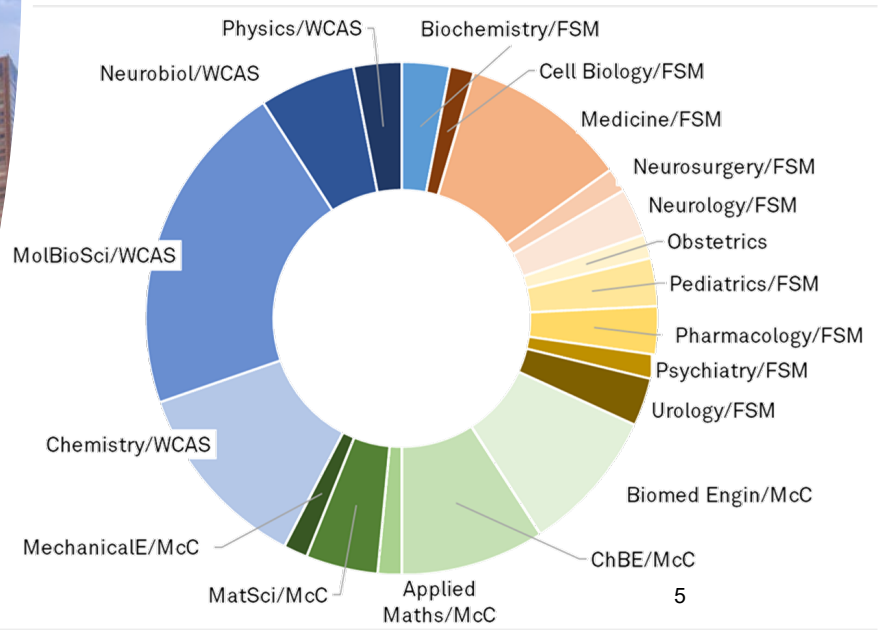
CLP Technology Development Programs and 8 Core Facilities Enable Discovery Science and Translation Across Northwestern

65 CLP faculty are distributed over 19 departments in 3 schools

31% Feinberg School of Medicine

26% McCormick School of Engineering & Applied Sciences

43% Weinberg College of Arts & Sciences



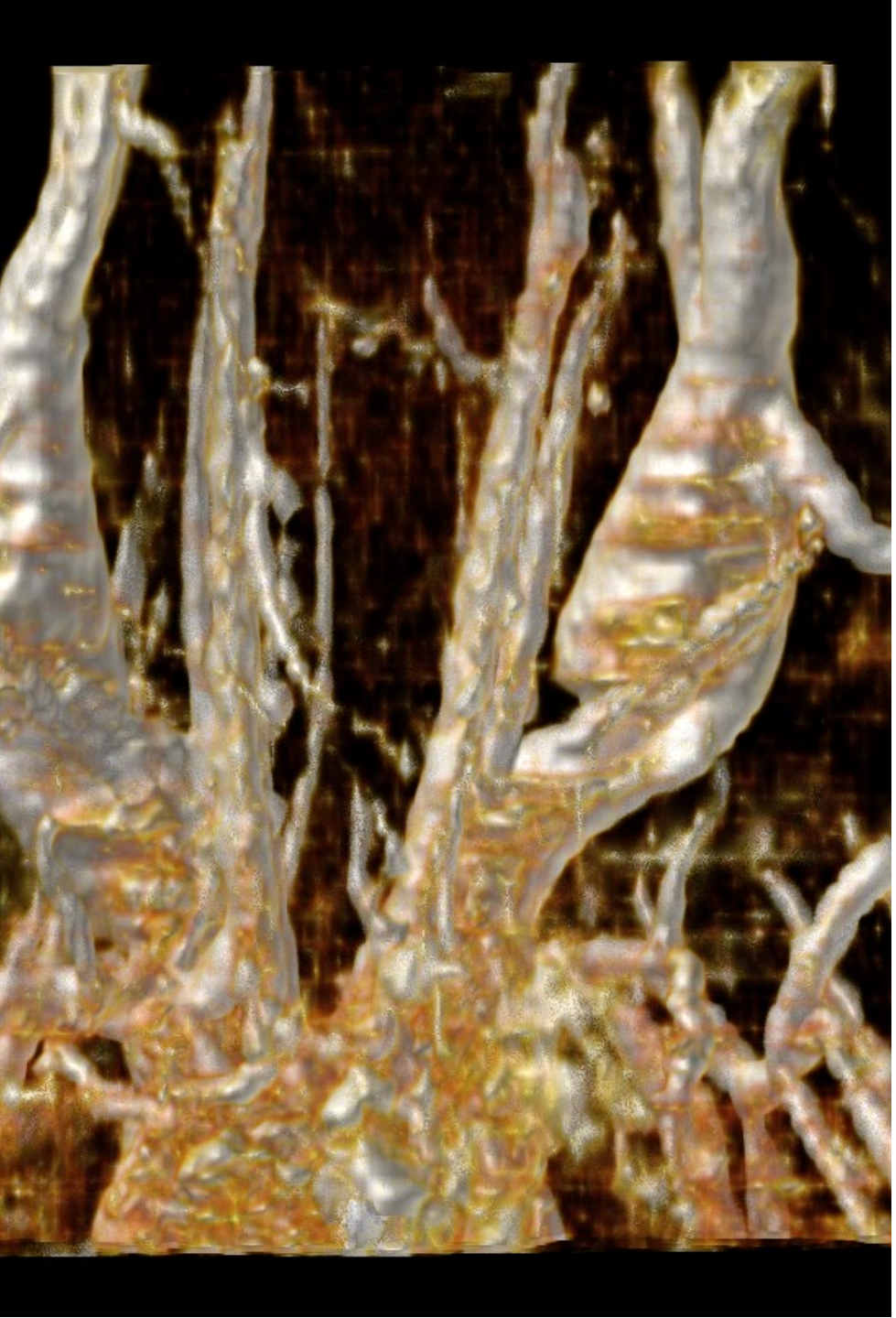
What We Have Accomplished: CLP 2009-2021
A Catalyst for Interdisciplinary Biomedical Research and Training

- 147,000 SF **Silverman Hall** for Molecular Therapeutics and Diagnostics.
- >500 Northwestern research programs benefitted from CLP's 8 award-winning **core facilities**.
- $23M NCI-funded **Physical Sciences-Oncology Center** created new methods for cancer diagnosis.
- NIH-funded **T32 program** for training predoctoral students at the interface of chemistry and biology.
- 3 **Undergraduate research programs** creating early opportunities for broadly cross-disciplinary training.
- $1M **CLP-Cornew Innovation Awards** to launch new team science returned $23M in new external funding.
- $16M in **National Research Resource awards** for developing and disseminating new proteomics and metallomics technologies.
- $47M **external funding** for interdisciplinary research programs.

The proposed plan addresses the questions posed by External Review, Office for Research, and CLP Executive Advisory Board.

CLP 2.0 Will

- Connect CLP and Feinberg School of Medicine researchers and clinicians to create chemical and physical sciences solutions for urgent clinical problems.
- Strengthen and expand translation of CLP-FSM innovations through rigorous review, CLP translational capabilities, and support and training for entrepreneurship.
- Accelerate discovery and innovation across Northwestern through technology development and collaboration.
- Increase large-scale research grant funding, elevate NU ranking, and raise CLP internal and external profile to increase philanthropic support and corporate partnerships.
- Create new opportunities for equity and diversity in training students in preclinical translation and team science.

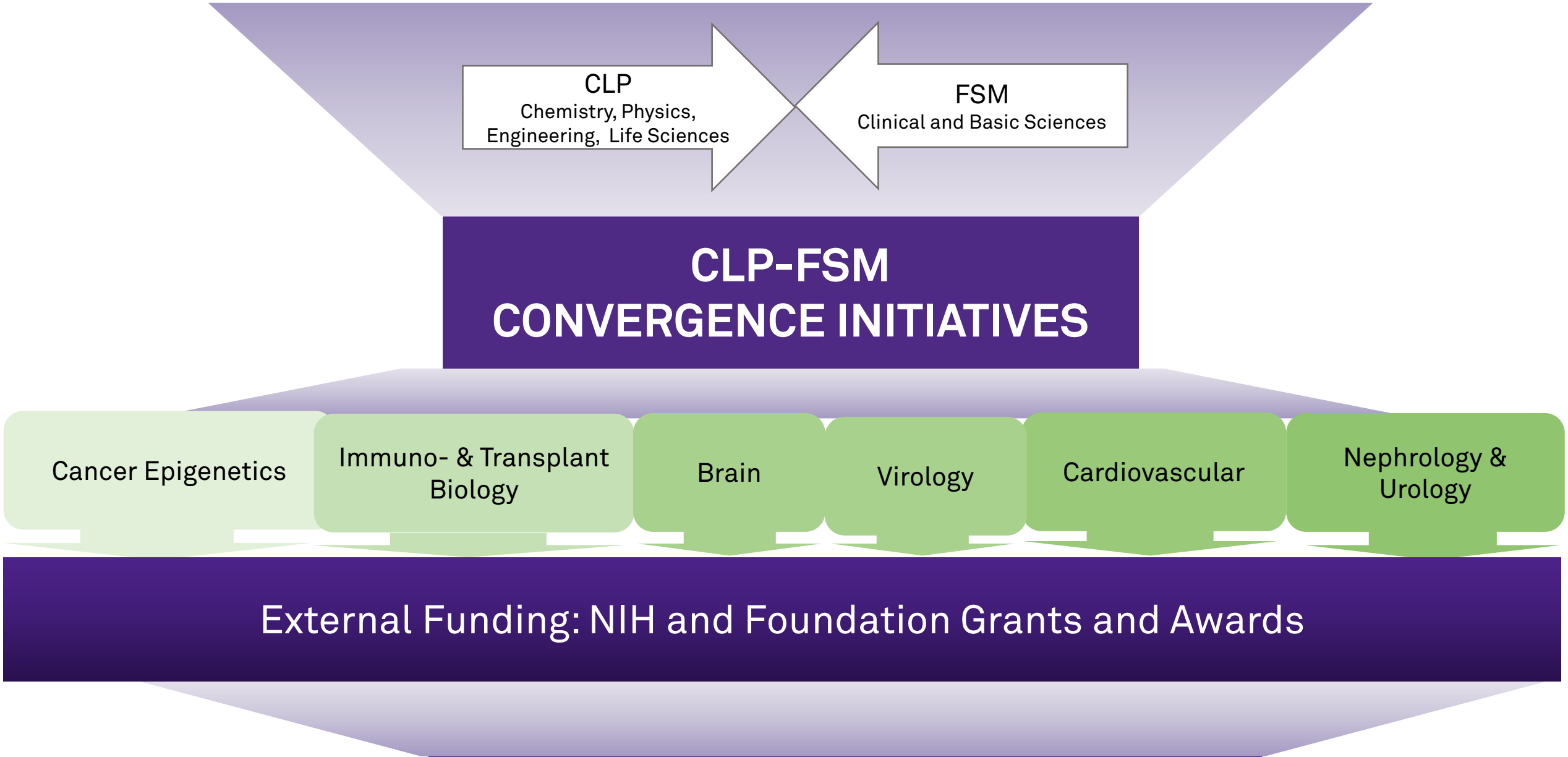


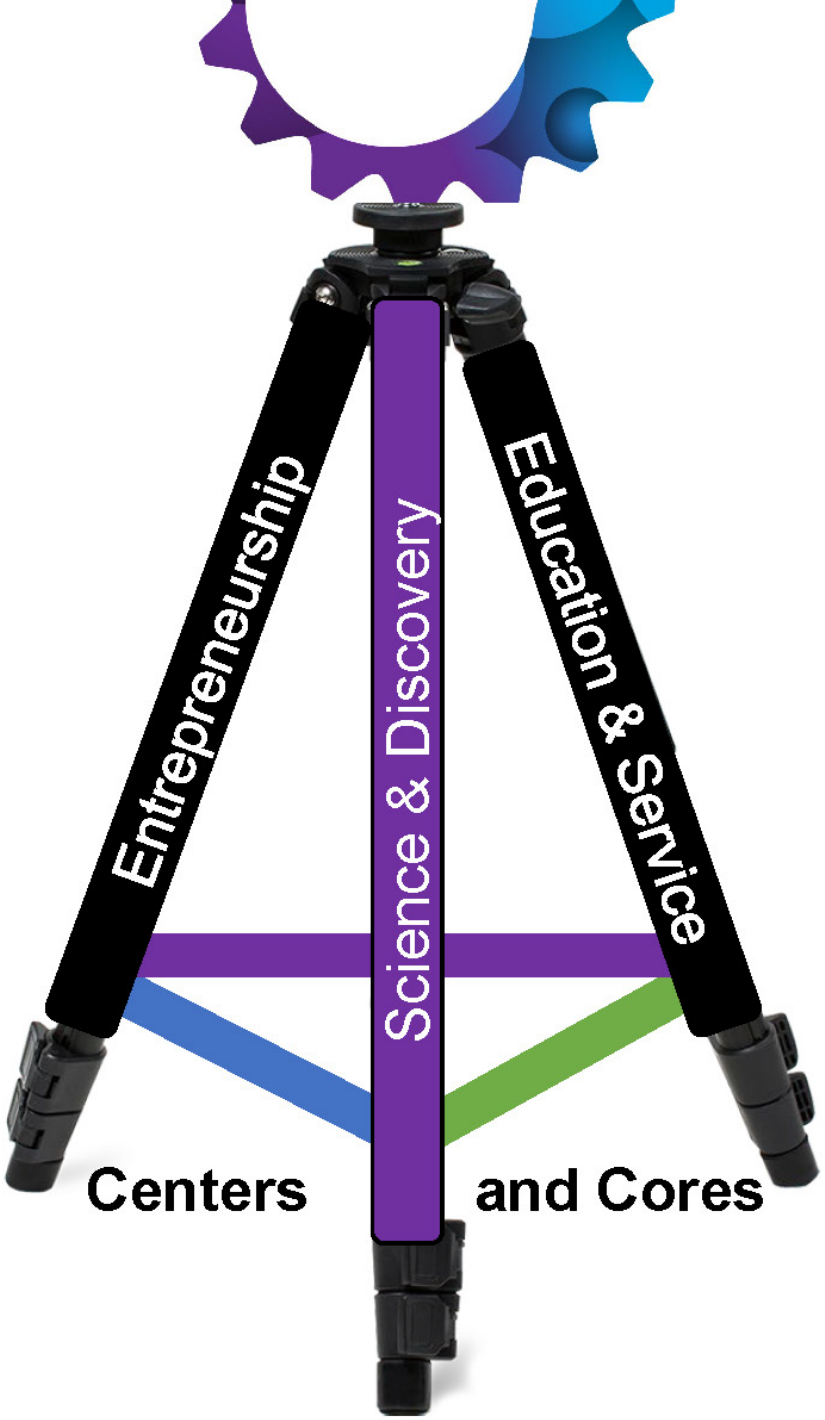
Goals for the Next Five Years

- Establish a new operational norm: run 4 **CLP-FSM Convergence Initiatives** per year, each of which will leverage the CLP/FSM interface to reach programmatic sustainability via federal and foundation support.
- Provide coaching and financial support to novice and experienced **entrepreneurs** to accelerate maturation of new companies.
- Enable **early-stage investigators** to pilot 10 high-risk, high-reward team science research projects.
- Expand CLP's impact on the biomedical research enterprise by **training CLP postdoctoral fellows** to bring chemistry to medicine in academia and industry.
- **Increase the diversity of the next generation of researchers** by providing Chicago area undergraduates from underrepresented populations with the opportunity for training in converging molecules and medicine.

Key Strategies for CLP 2.0

- **Converge chemistry with medicine** to address research problems in critical areas of clinical need.
- **Focus CLP resources on 4 clinically relevant thematic areas each year (2 funded)** to accelerate discovery and translation.
- Leverage CLP strength in synthetic chemistry, natural products, and cell-free synthesis to **develop new therapeutics and diagnostics** to meet societal needs.
- Train **early-stage investigators, students, and postdocs** to bring chemistry to medicine and create the next wave of biomedical innovation.


CLP
Chemistry, Physics,
Engineering, Life Sciences
FSM
Clinical and Basic Sciences
CLP-FSM
CONVERGENCE INITIATIVES
Cancer Epigenetics
Immuno- & Transplant Biology
Brain
Virology
Cardiovascular
Nephrology & Urology
External Funding: NIH and Foundation Grants and Awards
Targets, Biomarkers, Therapeutics & Diagnostics
Increase scale of Northwestern|Research



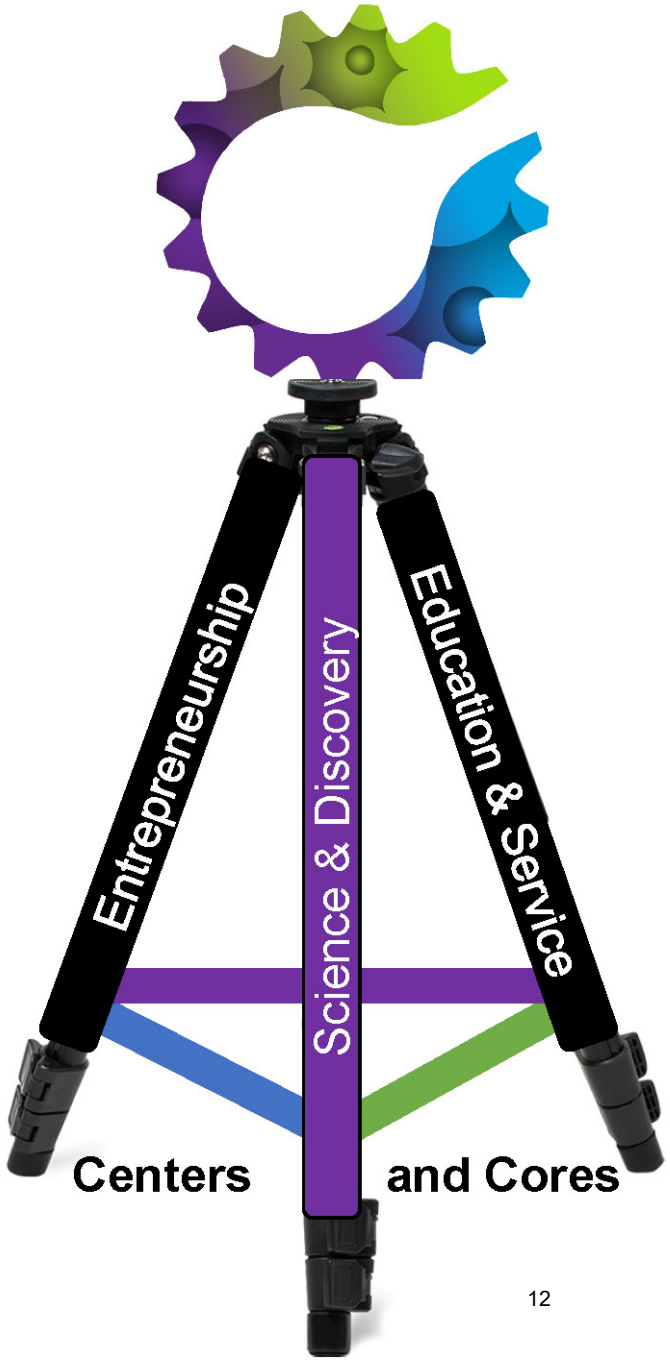
SCIENCE & DISCOVERY
What We Will Do

- Develop **convergence initiatives** built on “dream teams” of FSM and CLP researchers and provide **substantive funding for 2 years** to achieve competitiveness for large scale external funding.
- Disseminate CLP innovations and advance NU’s reputation for drug and diagnostics discovery and translation among key stakeholders.
- Support high-risk, high-reward biomedical research projects of interdisciplinary teams of junior faculty members.

SCIENCE & DISCOVERY
Short-Term Goals (1-2 years)

- Appoint **FSM Scientific Advisory Committee** to identify 4 areas of opportunity & collaboration.
- Provide substantive funding for 2 years for **Convergence Research Initiatives***.
- Award **Cornew Innovation funding** to 2-4 junior faculty teams.
- Launch annual **retreat** to sharpen focus, review progress and stimulate new collaborations.
- Initiate **annual Symposium** to disseminate knowledge and advance NU's reputation for drug and diagnostics discovery.
- Invite one **Visiting Scholar** to give a minimum of 2 lectures and collaborate on a minimum of 2 CLP faculty research projects.
- Host quarterly **Faculty Chalk Talks**, and annual Speaker Series featuring CLP and Feinberg investigators to foster cross campus collaboration.

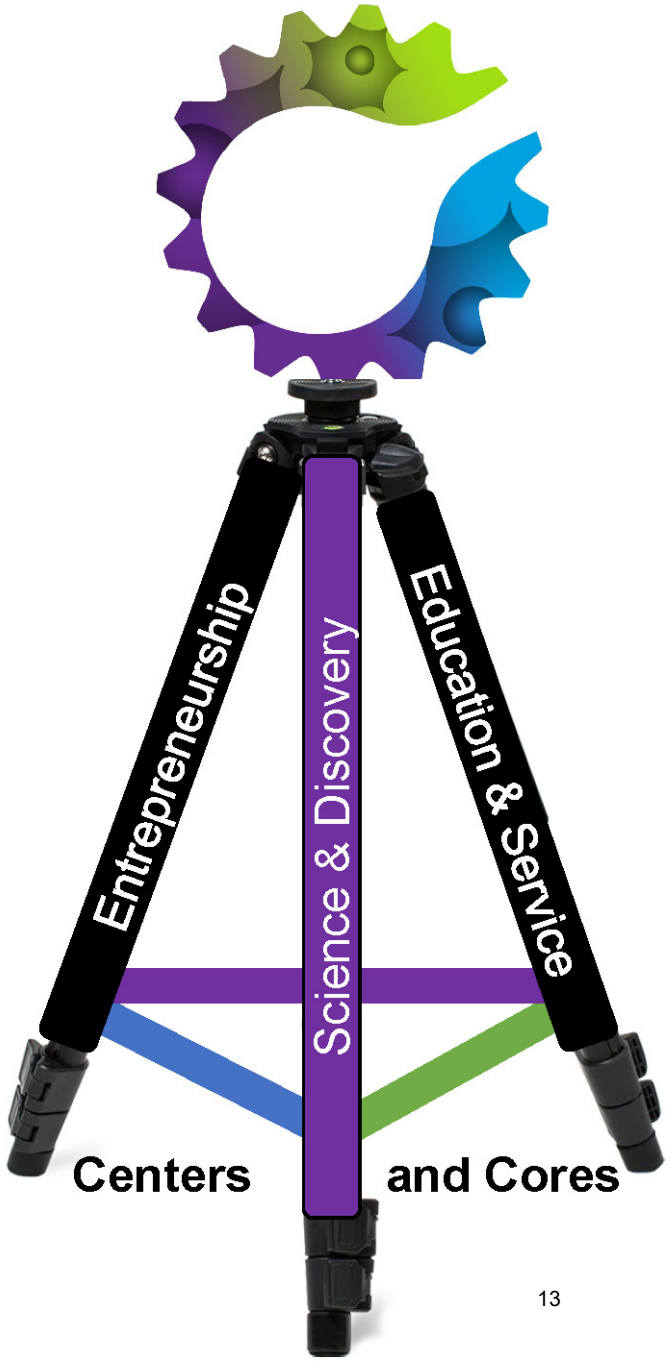
**Contingent upon funding.*

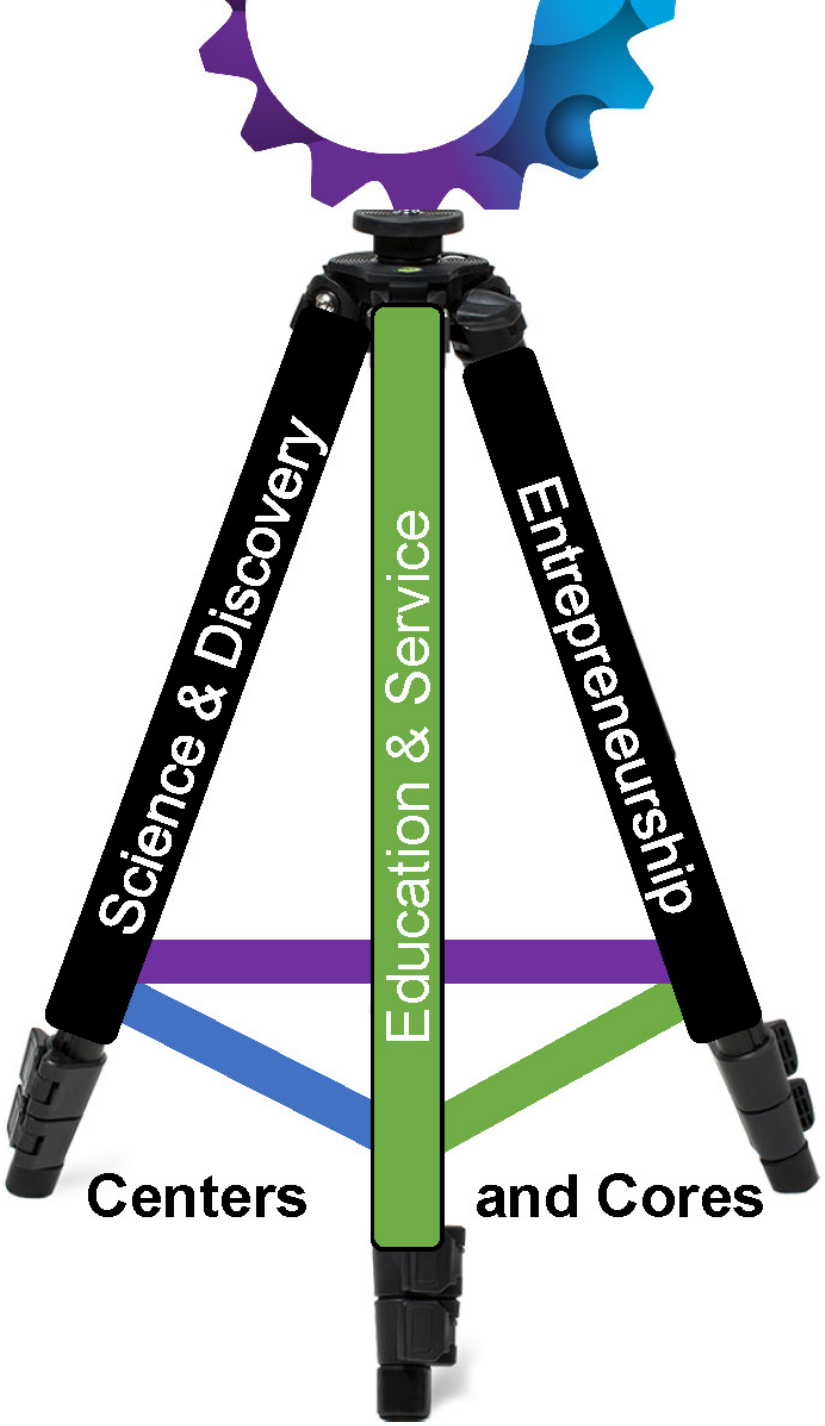


SCIENCE & DISCOVERY

Mid-Term Goals (3-5 years)

- Stimulate $20-$50M of new, external funding for 3 successful CLP/FSM research initiatives.
- Raise NU ranking through increased grant funding.
- 2-fold increase in joint publications and invention disclosures at the interface of medicine, life sciences, chemistry, & engineering.
- CLP elevated as national center of technology development for imaging, proteomics, & metallomics.
- 1-2 new corporate partnerships.
- 1-2 major gifts





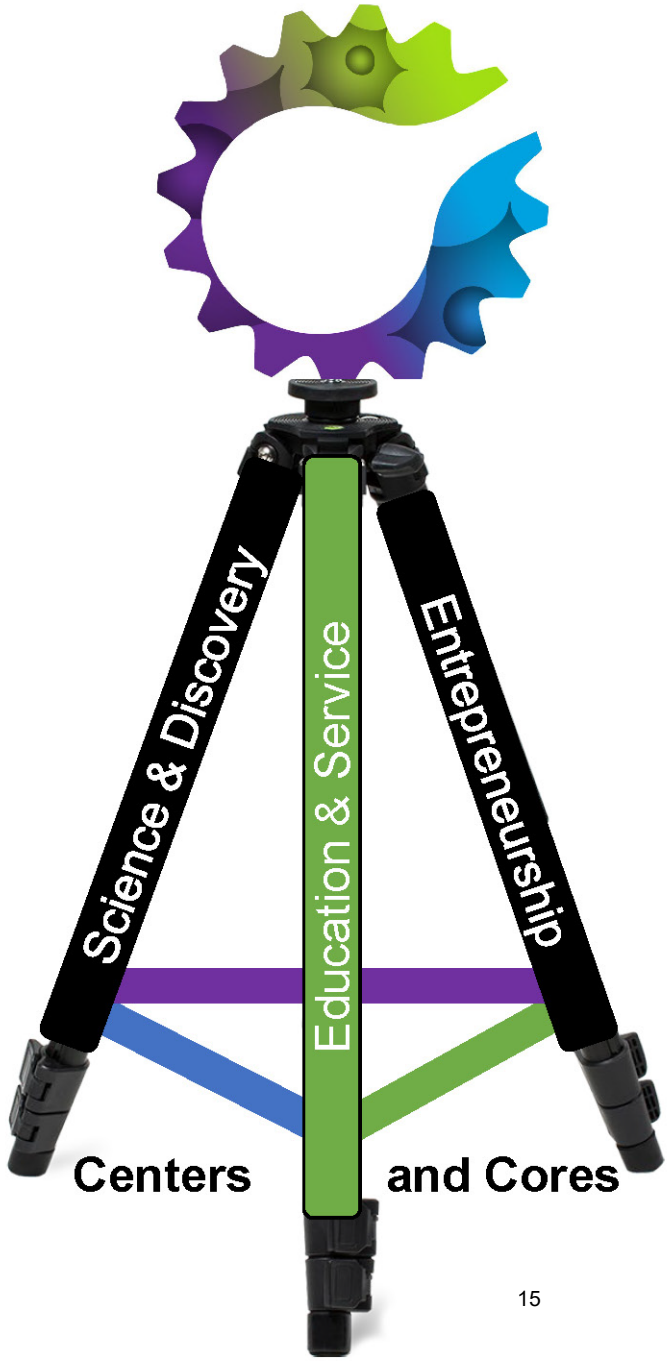
EDUCATION & SERVICE
What We Will Do

- Obtain new NIGMS funding to extend **CLP Predoctoral Training Program for five more years.**
- Create a vibrant **CLP Postdoctoral Fellows program*** that broadens the impact of CLP across academic and industry.
- Pilot a CLP **summer research program for Chicago undergrads** from major minority schools using PSOC summer URM program as model*.
- Appoint **CLP associate directors** who will advance strategic objectives in therapeutics, diagnostics, and modeling and computation.
- Ensure that Institute policies and practices foster **diversity, equity and inclusion** in all areas of operation.

**Contingent upon funding*.

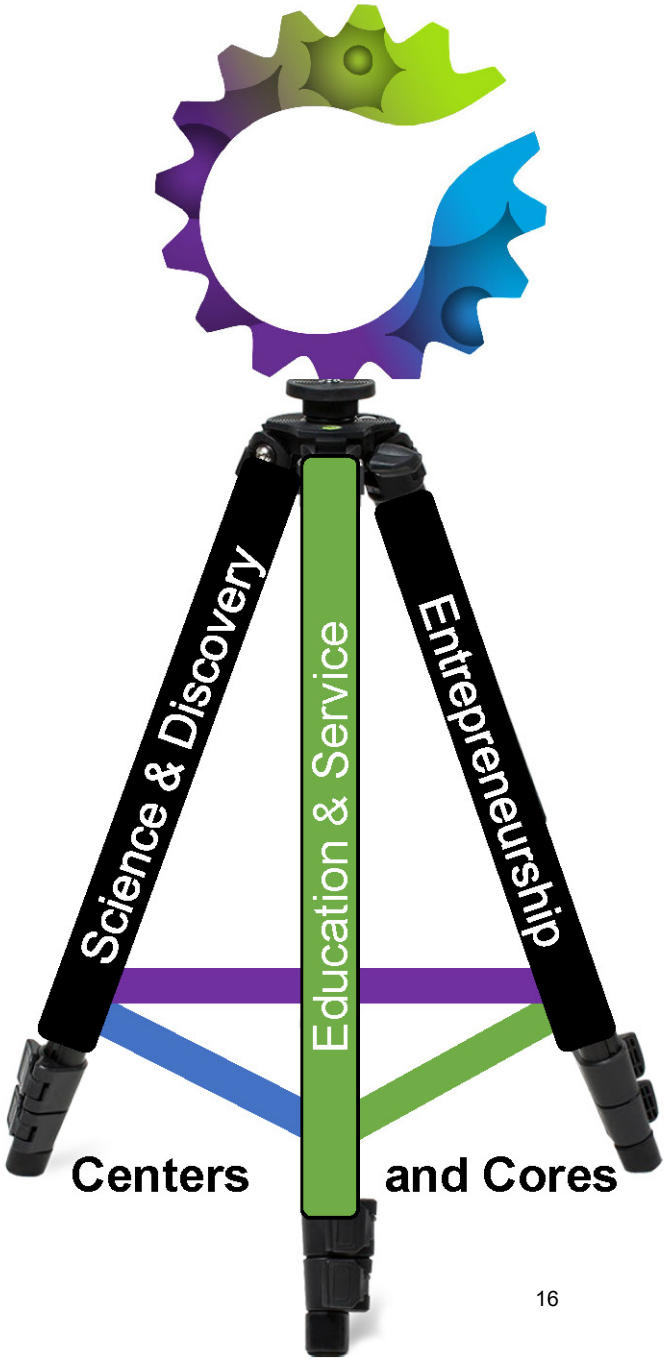
EDUCATION & SERVICE
Short-Term Goals

- Partner with majority minority Chicago colleges and universities to create local pipeline of students for **undergrad research program.**
- Committee of faculty, students, and staff identify approaches to address **diversity, equity, and inclusion** across CLP.
- **Postdoctoral Fellows Program** recruitment and selection of initial candidates.
- **Visiting Scholars Program** launched.
- Continue to **train and prepare predoctoral students** for careers in academia and industry
- NIH **T32 grant application** submitted by May 2022.



EDUCATION
Mid-Term Goals

- 50% increase in URM undergrads participating in interdisciplinary research in CLP labs.
- >85% CLP Postdocs enter faculty and industry positions or spin out with companies.
- 20% increase in competition for CLP trainee and postdoc positions.
- New NIH predoctoral program established.



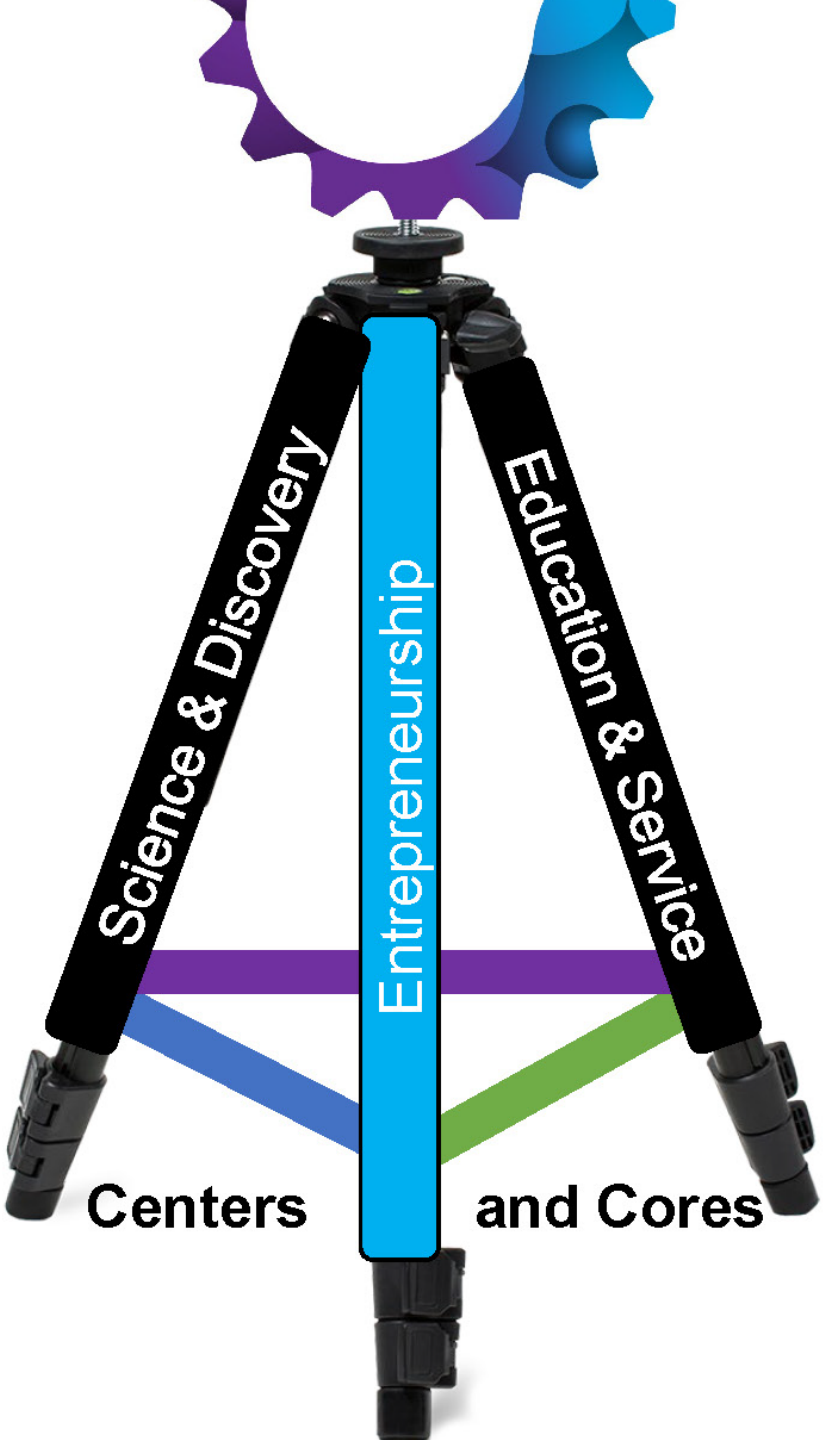
ADMINISTRATION & SERVICE
Short-Term Goals

- Revamp CLP leadership structure.
- Survey core facility instrument and space needs and plans.
- Create comprehensive plan for CLP cores and Institute space in Silverman Hall.
- Restore CLP community building events, such as Core Crawl and annual picnic.
- Core facility staff participate in external workshops and conferences.
- Partner with NU Office for Development to create new CLP fundraising materials and approaches.
- Advance NU/CLP's reputation for science and discovery through effective storytelling and average 20% annual growth in earned media.

ADMINISTRATION & SERVICE

Mid-Term Goals

- Alignment of core facility space and funding with Institute's strategic priorities.
- Increased marketing leads to greater internal and external visibility.
- New CLP gifts and endowments that enable program creation and growth.

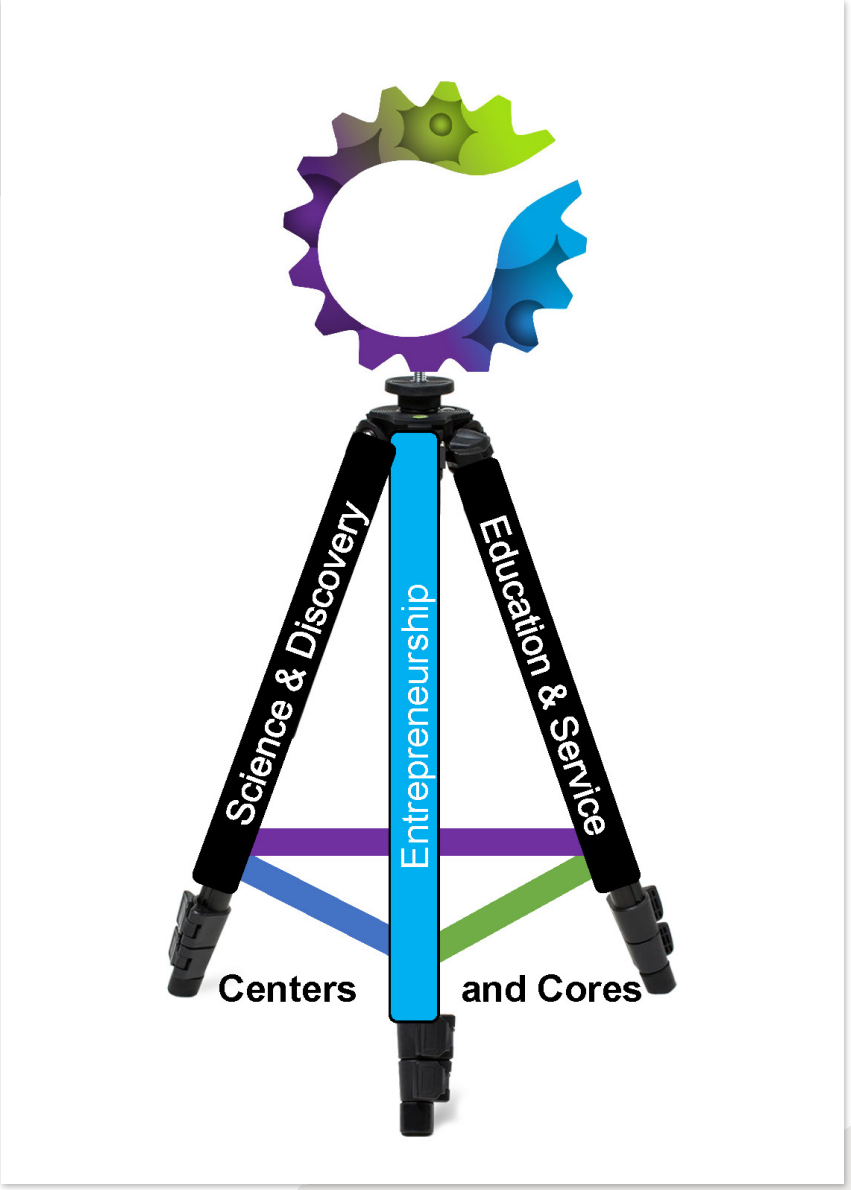


ENTREPRENEURSHIP
What We Will Do

- Make the **CLP-Oppenheimer Annual Investor's Conference a highly coveted invitation for investors and potential pharma partners.**
- **Grow collaborations** with Kellogg, INVO, and CBC to support entrepreneurship and translation.
- Strengthen ties with **NewCures.**
- Create **CLP eFund** to support new faculty startups, provide SBIR consultation, and determine milestones.
  - Part-time EIRs who can spin out with faculty companies
  - Consultant services
  - Partial support for 5 new startups

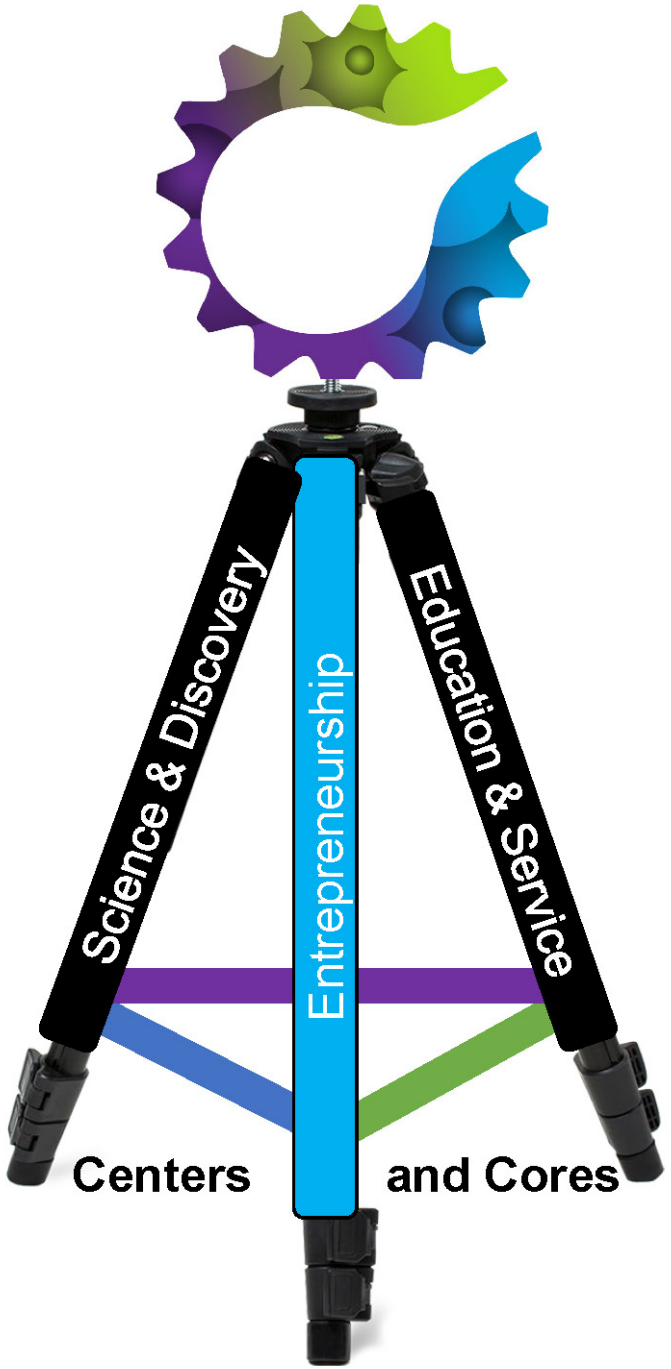
ENTREPRENEURSHIP
Short-Term Goals

- Use CLP eFund to **hire coaches and EIRs.**
- Solicit and select 5 applications from startups for investment. Leverage EAB expertise to vet projects.
- CLP leadership meet quarterly with **INVO, Kellogg and CBC** to coordinate programs and activities.



ENTREPRENEURSHIP
Mid-Term Goals

- Increase corporate engagement by 50%.
- Increase recruitment of entrepreneurial postdocs, students, and faculty.
- Advance 5 new therapeutics and diagnostics to NU accelerator by enabling completion of preclinical studies.



To Fulfill Our Vision

CLP 2.0 expense budget to achieve the discovery, training, and translational goals of this bold plan.

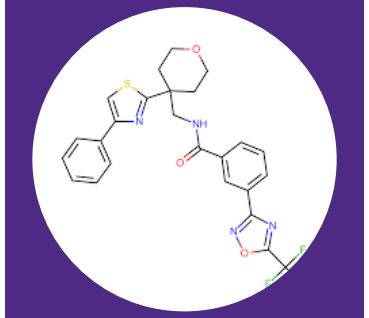
Convergent Science & Discovery: **$337,000 in year 01.** We will return multiple, externally funded programs and deep, meaningful relationships with FSM to help NU approach $1B/year in external funding.

CLP eFund: $264,000 in year 01. Support for entrepreneurs to accelerate maturation of new companies with funding for EIRS, consultants, and preclinical studies for multiple faculty spinouts.

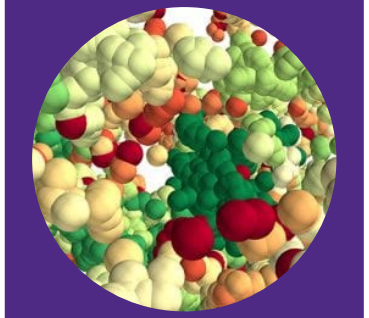
Education and Service: $1.05M in year 01. Supports CLP operations to enable the Institute to continue to engage with and propel myriad activities for accelerating discovery and innovation, facilitate translation and entrepreneurship, and interdisciplinary training and education. Includes new programs to extend training to postdoctoral fellows and underrepresented groups in STEM.

We will seek philanthropic support, Federal funding, and funding from FSM partners, and corporate sponsorship for new programs and initiatives.

Long-Term Impact



CLP therapeutics and diagnostics will lead to new therapies and improve treatment



New knowledge at the frontier of medicine and physical sciences will advance understanding of health & disease

Technologies developed by CLP researchers will lead to new scientific discoveries

Next generation CLP researchers will disseminate CLP approaches to academia, pharma, and biotech

CLP IP and faculty spinouts will drive commercialization

NIH

Major CLP grant awards will push Northwestern to the $1B mark in external funding