PATHS-UP

Precise Advanced Technologies and
Health Systems for Underserved Populations

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Overall Goal & Objectives Innovation Ecosystem

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PATHS-UP – Members' Position in Value Chain

Step 1A: Who to contact

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Active Prospects in Value Chain

PATHS-UP ERC

	Suppliers (Goal 10 members – 7 existing)	Manufactures – OEM's (Goal 10 members – 9 existing)	Providers | Payers (Goal 5 members – 1 existing)
	Raw Mat'l | Software | Photo-Sensors | Semi-conductors Communication | Contract Mfg | Biologics	Pharmaceutical Diagnostic | Medical Device | Wearable | Small	Hospitals | Clinics | Retail Care Private Insurance | Foundation
High Interest	DSM, Glytec	Qorvo, TANDEM DIABETES CARE, COOK GROUP	CENTENE Corporation, JDRF ONE WALK, HELMSLEY
Medium Interest	Microsoft, Google, secant group, IBM, leidos, NEUVA TEK	gsk, Dexcom, glooko, BAYER, BD, Sentinel, BIO-RAD, SANOFI, DIGITOUCH HEALTH, Sanvita Medical LLC, KNOW	Humana, Anthem, aetna, MOLINA HEALTHCARE, BlueCross BlueShield, UnitedHealthcare
Initial Contact	medaptive health, COMPAL, Benchmark, icralyne, sabic, amazon, QUALCOMM, Donatelle, AT&T, Millar, xsensio, Tech-Etch	IMS, InnoMed, bigfoot BIOMEDICAL, profusa, JanaCare, Abbott, Roche, JuneBrain, INTUITIVE SURGICAL, Genentech, SIEMENS, novo nordisk, stryker, ASCENSIA Diabetes Care, Luminex, InformAI, O2M, P&G, VigilantDx	Superior Health Inc., MEDTECH INNOVATOR ACCELERATOR, WellCare, onduo, MCNAIR, DAY TWO, GREATER HOUSTON PARTNERSHIP, CVSHealth, American Diabetes Association. Connected for Life

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Recruiting Ideas – Keep Pipeline Full

Basic Blocking and Tackling – Hit rate will be in single digits

- Personal experience: 400 companies since Jan 2019 - Jan 2022 – 4.5% joined Center
  - Want 30 companies to join @ 5% close rate = 600 companies
  - Will LOSE companies – 5-10% a year

- Target list of companies – Big's are known
- Medium companies are most likely at conferences - maybe
  - Conferences are in flux - $2.5-$5K to register – Choose wisely
  - Speakers at conferences/tradeshows
- Small companies – look at SBIR/STTR, NIH, SECO – awardees past 3 years

- Social Media:
  - LinkedIn Value proposition – Match Tech to need
  - Send to 20 prospects – effective if 20%-40% responds

Recruiting Ideas – Target Lists

Need "human" contact. Zoom is OK – F2F is best.

- Faculty help
- Tech alumni at target companies

- Use Linkedin network to see who is the best person in your network
  - Who can give personal introduction to the CEO or the CFO - They are the decision makers.
  - Need a good introduction to their executive team
    - Need to coach the person who gives the intro.

Example of a proposed simple message for a introduction:

"This team at Texas A&M is on to something. They received a $40M National Science Foundation grant to build next generation monitoring platform to lower chronic care cost and improve patient outcomes. ***They could help Livongo move beyond diabetes and give Livongo a unique protectable IP position long term. Livongo should check out what they are doing."***

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Value Proposition, Research, & Impact

- **Value Proposition… a "Fat" statement…**
  - Different meaning to NSF/Grant, Industry, Stakeholders
    - ILO role – What is VP to Industry
      - How to show research IS creating value…and impact

- **VP evolves over time at a ERC**
  - Global/Core VP not likely to change
    - Influences on internal/external research findings
    - Influences on new industry technologies
    - Influence from the Boards
      - How does that feedback to research projects

Step 1B: What are you selling

The Grand Challenge

Every 30 seconds *one American will be diagnosed with diabetes, and another will suffer a coronary event.*

These chronic diseases represent a disproportionately larger burden in underserved communities across the US and the world due to higher prevalence and reduced access to care

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A Response to the Grand Challenge: PATHS-UP Engineering Research Center

Lab in your Palm

Lab on a Wrist

Vision

To change the paradigm for the health of underserved populations by developing revolutionary and cost-effective technologies and systems at the point-of-care (POC).

Mission

1) To engineer transformative, robust, and affordable, technologies and systems to improve healthcare access, enhance the quality of service and life, and reduce the cost of healthcare in underserved populations.

2) To recruit and educate a diverse group of scientists and engineers who are ready to lead the future in developing enabling technologies to improve health in underserved communities

Impact

Bringing affordable point-of-care healthcare technologies to urban and rural communities that lack access to care.

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Three Subsystems for Lab in your Palm

Sub-System Vertical Flow Assay/Reader

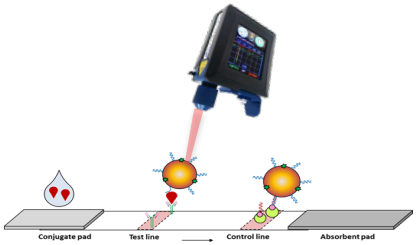
Core Technologies

Multiplex Assay: hs-cTnL, FABP, Myo, CK-MB

Reader: Fluorescence, chemiluminescence, gold-ion amplification

Status: Technology Readiness Level (TRL) of 3.5

Sub-System Lateral Flow Assay/Reader



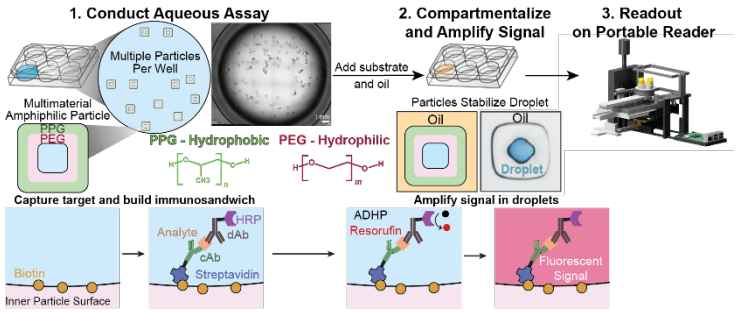
Core Technologies

Multiplex Assay: BNP, sST2, CRP

Reader: Dual Fluorescence &Surface Enhanced Raman, nano particle amplification

Status: TRL of 2.5

Sub-System Lab on a Particle



Core Technologies

Multiplex Assay: NT-pro BNP, CRP. cTnL

Reader: Fluorescence, raspberry-PI multimodality for droplet size

Status: TRL of 2.0

Lab in your Palm

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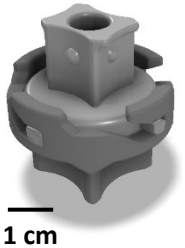
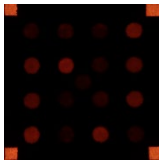
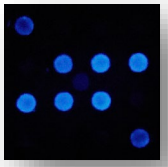
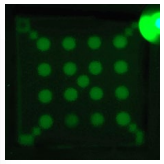
Sub-System Vertical Flow Assay Platform

Vertical Flow Assay (VFA) cartridges





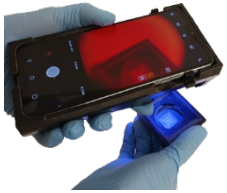




Fluorescence Chemiluminescence Au-ion reduction

Vertical Flow Assay (VFA) readers

Fluorescent reader



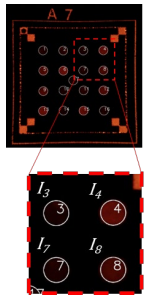
Chemiluminescent reader

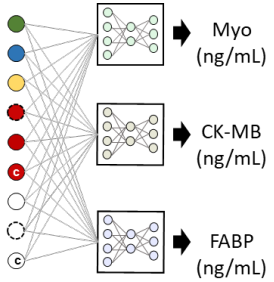
Au-ion reduction reader

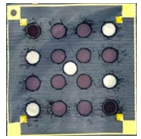
Multiplex detection of cardiac markers (Myoglobin, CK-MB, FABP)

Highly sensitive cTnI measurement (<10 pg/mL)

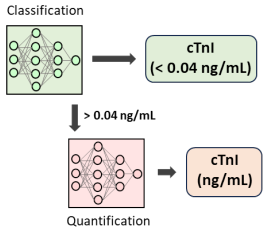
Computational analysis (AI-based signal readout)







Pos control (N_{pos}=2)
Neg control (N_{neg}=5)
Test spots (N_{test}=10)



Unique Core Technology

Paper-Based Multiplexed VFA (cost-effective, rapid, and easy to use)

Integration of highly sensitive analytical methods: Fluorescence, chemiluminescence, gold-ion amplification

AI Imaging/Deep Learning-based readout

Key Accomplishments

Limits of Detection (LoD) are below clinical cut-offs for Myo, CK-MB and FABP. Completed clinical studies for multiplex detection. Multiplex detection in 15 min.

Sub-pg/mL LoD using Au-ion reduction assay for hs-cTnI. Completed clinical study with 56 samples. cTnI quantification in 20 min.

Technology Readiness Level (TRL)

TRL 3.5

(4) Patents: CRP &Lyme Assays

(1) Start-up (Hana Diagnostics)

(34) Publications

(1-3) Future Potential IP's

Next Steps

Initial usability and human factor-related design studies and feedback to research teams (started in collaboration with T4)

Developing multiplexed panels with cTnI. Clinical blind testing with fresh blood samples from a cohort of patients to establish LOD, CV, accuracy, etc

Establish pre-prototype for POC testing

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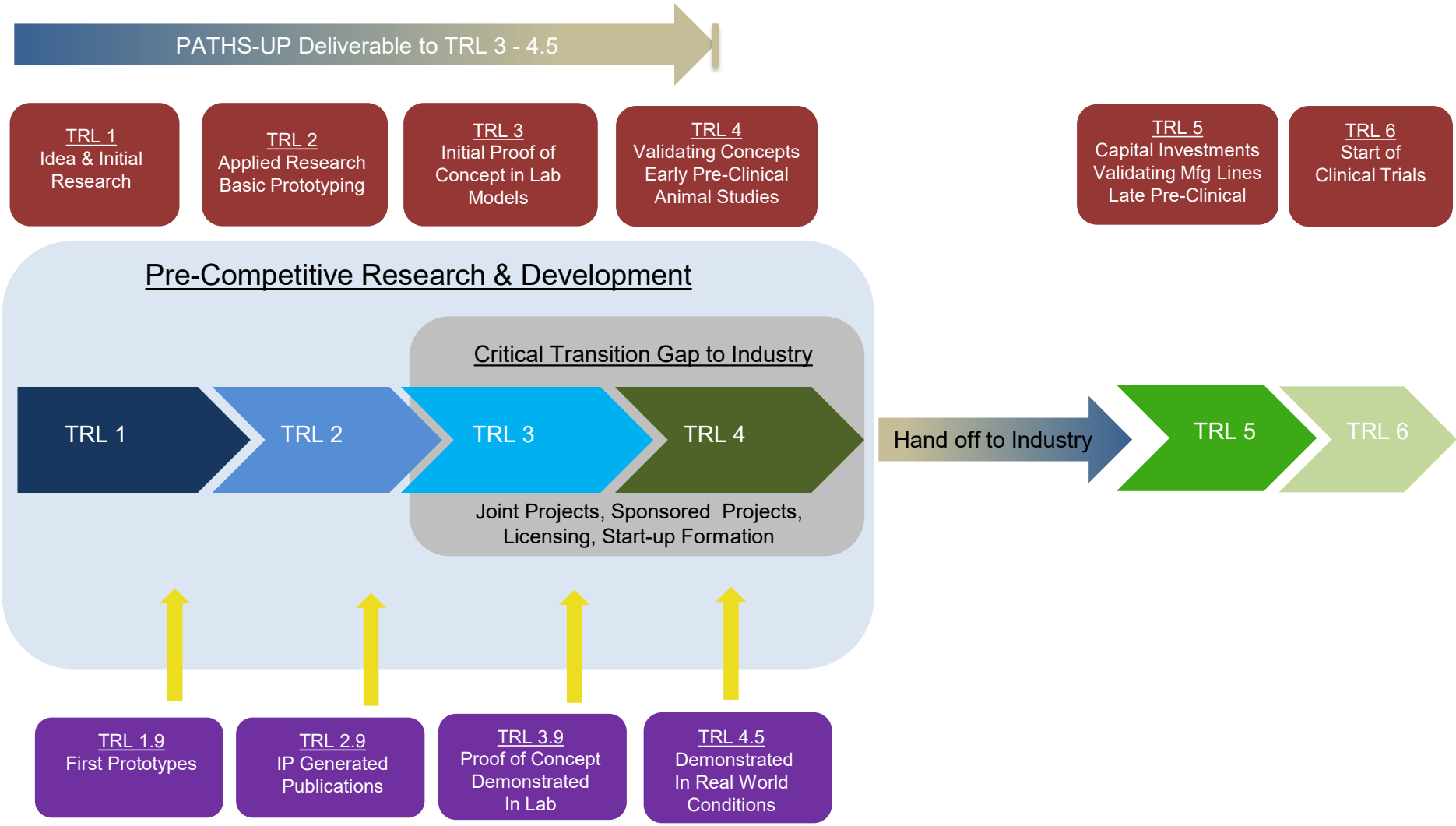
PATHS-UP Technology Readiness Level (TRL) for Transition to Industry



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Recruitment, Retention, and Relationship Building

- **Pre-Covid…travel, travel, travel**
  - In-Person meetings, conferences, tradeshows
    - Phone conservations, e-mail
    - "Old" Best Practices

- **Pandemic Times…no travel**
  - Zoom meetings, virtual conferences/tradeshows, digital communications
    - Not the greatest…missing key elements…Just trying to hang on
    - Positives & Negatives

- **Post Covid…Hybrid Model…**
  - In-Person…when to use it
  - Zoom Meetings…when to use it
  - Travel Costs…when to go to conferences, tradeshows…can justify?!?
  - Priorities – dependent on ERC life cycle? Sponsored Projects?
  - "New" Best Practices

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Recruitment, Retention, and Relationship Building

- **Recruitment items**
  - Target lists – Who contact with correct VP message
  - Pitch deck or overview of Center
    - Website, 1-pagers, publications, intro e-mail
  - Balance between Zoom (Intro meetings) & F2F (deep dive)

- **Retention items**
  - Communications with "Champion" at company
    - F2F at least 1/year – get to know them
    - Need other contacts within organization (Boomer Retirement)
    - What is their roadmap/needs (Tech, workforce, other)
    - Help refine VP of Center to Company
    - More Engagement = High Retention

- **Early years 80% time at recruit – Then 80% retain in later years**
  - Prospecting never ends – will loose companies

Overall Goal for Innovation Ecosystem

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