



NSF Campus Cyberinfrastructure PI and
Cybersecurity Innovation for Cyberinfrastructure PI Workshop
October 3-4 | Albuquerque, New Mexico

NSF Program (either CC or CICI): CICI

Program Area: RSARC

Award Number: 1738965

PI: Yan Luo

co-PIs: Yu Cao, Peilong Li, Silvia Corvera, Jomol Mathew

**Project Title: SECTOR: Building a Secure and Compliant
Cyberinfrastructure for Translational Research**



Yan Luo

Professor of Electrical and
Computer Engineering
University of
Massachusetts Lowell
Yan_Luo@uml.edu



Yu Cao

Associate Professor of
Computer Science
University of
Massachusetts Lowell
Yu_Cao@cs.uml.edu



Peilong Li

Research Assistant Professor
Electrical and Computer
Engineering
University of Massachusetts
Lowell
Peilong_Li@uml.edu



Silvia Corvera

Professor of Molecular
Medicine
Univ of Massachusetts
Medical School
Silvia.corvera@umassmed.edu



Jomol Mathew

ACIO of Information
Technology
Univ of Massachusetts
Medical School
Jomol.Mathew@umassmed.edu



NSF Campus Cyberinfrastructure PI and Cybersecurity Innovation for Cyberinfrastructure PI Workshop

October 3-4, 2017 | Albuquerque, NM

Quad Chart for:

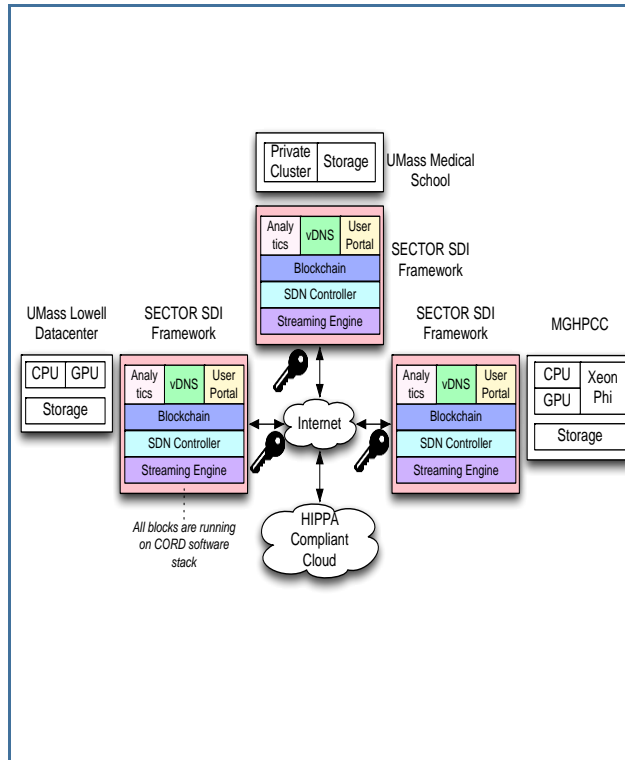
SECTOR: Building a Secure and Compliant Cyberinfrastructure for Translational Research

Challenge:

- Traditionally closed environment is not efficient to facilitate secure data sharing among multiple stakeholders
- Bandwidth and cost of cloud-based computing do not scale well with emerging needs
- Lack of regulation compliant computing facility for patient data diagnosis and analytics.

Solutions:

- Employ **blockchain** technique to facilitate secure and accountable data sharing among different parties.
- Leverage **SDI** on the network edge to provide higher data bandwidth and less transmission latency.
- Employ advanced network security, PKI model and authentication techniques to ensure regulation compliance.



Broader Impact:

- Benefit clinical research that relies heavily on analysis of sensitive data
- The proposed software defined security infrastructure can be applied in a wide range of IT infrastructures that carry sensitive data
- Strengthen the collaboration among computer scientists, clinical researchers, IT managers

Metadata tag

- <https://acanets.uml.edu/?p=407>
- Just launched this Sept.
- Currently works with UMass Med to understand their analytics research requirement
- Working on the blockchain infrastructure - HyperLedger



NSF Campus Cyberinfrastructure PI and
Cybersecurity Innovation for Cyberinfrastructure PI Workshop
October 3-4 | Albuquerque, New Mexico

NSF Program (either CC or CICI): CICI

Program Area: Secure Data Award Number: 1547428
Architecture

PI: Yan Luo

co-PIs: Xinwen Fu, Yu Cao, Martin Margala

**Project Title: STREAMS: Secure Transport and REsearch
Architecture for Monitoring Stroke Recovery**



Yan Luo

Professor of Electrical and
Computer Engineering
University of
Massachusetts Lowell
Yan_Luo@uml.edu



Xinwen Fu

Associate Professor of
Computer Science
University of Central
Florida
XinwenFu@ucf.edu



Yu Cao

Associate Professor of
Computer Science
University of
Massachusetts Lowell
Yu_Cao@cs.uml.edu



Martin Margala

Professor and Chair of Electrical
and Computer Engineering
University of Massachusetts
Lowell
Martin_Margala@uml.edu



NSF Campus Cyberinfrastructure PI and Cybersecurity Innovation for Cyberinfrastructure PI Workshop

October 3-4, 2017 | Albuquerque, NM

Quad Chart for:

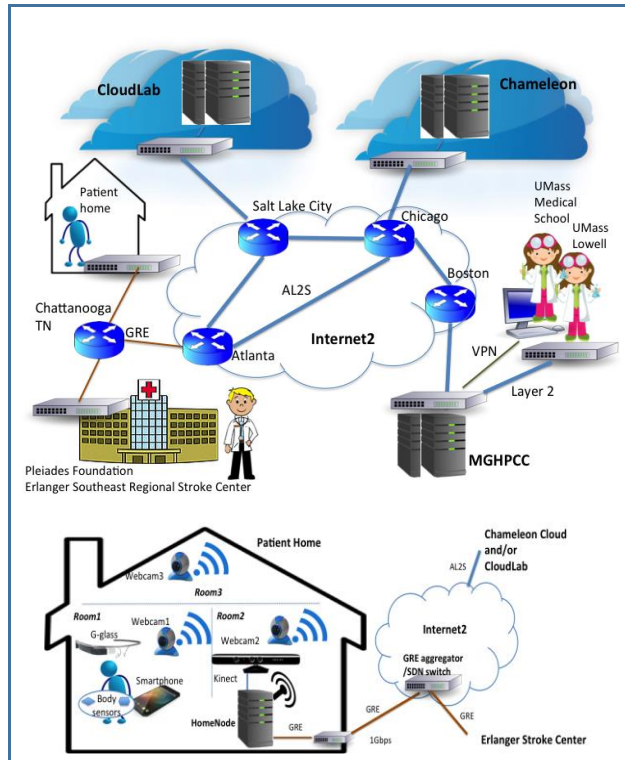
STREAMS: Secure Transport and REsearch Architecture for Monitoring Stroke Recovery

Challenge:

- **Networking:** Dynamically determine resource demands and control the allocation to different sensors and applications to render optimal performance and scalability
- **Data Security:** sensor-generated ePHI requires strong security protection to meet HIPAA/HITECH compliance

Solutions:

- **Role Based Access Control (RBAC) framework:** authenticate users and control the information flow
- **End-to-end security and integrity:** securely transport sensor data from patients to cloud, healthcare providers and researchers
- **Enhanced data analytics algorithms with security techniques:** control data access and isolate sensitive data in a shared cloud platform



Scientific Impact:

- The first prototype to provide data analytics-based healthcare to stroke patients in a clinical environment.
- Employ S2DN architecture to authenticate, identify, and direct encrypted data streams.
- Fusing multimodal sensor data by using analytics algorithms to learn about patient activities that are highly relevant to stroke recovery

Metadata tag:

- <https://acanets.uml.edu/?p=7>
- 2 Scientific Papers
- Peilong Li, Chen Xu, Yan Luo, Cao Yu, Jomol Mathew, and Yunsheng Ma. CareNet: building regulation-compliant home-based healthcare services with software-defined infrastructure. IEEE CHASE 2017.