

**C3.ai Digital  
Transformation  
Institute**

# Matchmaking for C3.ai DTI

Tandy Warnow

## Important information

C3.ai DTI <https://c3dti.ai>

First call for proposals is for COVID-19 research, broadly envisioned, but drawing on Artificial Intelligence, Machine Learning, Cloud Computing, and taking advantage of the computational resources at C3.ai, NCSA, and NSERSC

Proposals due May 1, 2015

Interdisciplinary, multi-institutional teams encouraged

PI must be at one of the consortium universities

UIUC wiki <https://wiki.ncsa.illinois.edu/display/C3aiDTI/C3.ai+DTI+Home>

## Today: Helping teams to form

3-minute presentations!

Goal: Introduce yourself (your department and affiliation, your skill set, what kind of collaborators you are looking for, and describe your research idea) –

Then Q&A afterwards, and opportunities for additional presentations

Send your single PPTX (using template from wiki) to Jay Roloff; make sure you have included your email address and webpage!

Note: researchers from around the world will be on this call (including public health researchers from the UK and the Univ of Pittsburgh), looking for opportunities to join teams

At the end, we will share the contact info (names, affiliations, and email addresses) with all attendees

This call will be recorded and the recording will be shared

## C3.ai DTI Contact Information at Illinois

R. Srikant, [rsrikant@illinois.edu](mailto:rsrikant@illinois.edu) (Co-Director, c3.ai.DTI)

Tandy Warnow, [warnow@illinois.edu](mailto:warnow@illinois.edu) (Co-chief Scientist, c3.ai.DTI)

Jay Roloff, [jayr@illinois.edu](mailto:jayr@illinois.edu) (Executive Director @ Illinois, c3.ai.DTI)

# University of Pittsburgh

## Public Health, Biostats, Epidemiology

### Potential Collaborators (current list)

- **Shyamal Peddada, Public Health**, <https://publichealth.pitt.edu/home/directory/shyamal-peddada>
- **Ashley Isaac Naimi, Public Health**, <https://publichealth.pitt.edu/home/directory/ashley-i-naimi>
- **Lu Tang, Biostatistics**, <http://www.pitt.edu/~lutang/>
- **Jong Jeong, Biostatistics**, <https://publichealth.pitt.edu/home/directory/jong-hyeon-jeong>

### Other contacts (may enable to find other collaborators):

- **Velpandi Ayyavoo, Associate Dean for Research, Public Health**, <https://publichealth.pitt.edu/home/directory/velpandi-ayyavoo>
- **Rob Rutenbar**, <https://www.chancellor.pitt.edu/people/rob-rutenbar>

### Looking for:

- Teams that need biostatisticians, public health researchers, or epidemiologists
- Researchers interested in the problems listed at <https://publichealth.pitt.edu/biostatistics/about/special-message-from-the-chair>

Name: Julia Lane

Department: Center for Data and Computing (CDAC)

Webpage: [cdac.uchicago.edu](http://cdac.uchicago.edu)

email address: [jlane2@uchicago.edu](mailto:jlane2@uchicago.edu)

### **UChicago Collaborations:**

- If you have a potential project and need help identifying a data science collaborator at UChicago, please contact me, with a brief description of the project and research question of interest.

### **Teaming Inventory:**

- You can also submit an idea to the C3DTI Team Matchmaking: Collaboration Inventory:  
<https://docs.google.com/forms/d/e/1FAIpQLSdiBV8y1BpJ2w9M-enfmklCfNcXz5rhfYL7KLttV0rlcW4FFw/viewform>
- Complete the form to indicate interest in collaborating on a proposal to the C3DTI's first call for proposals and access the spreadsheet of all potential collaborators.

Name: Tarek Abdelzaher

Department: Computer Science

Webpage: <http://abdelzaher.cs.illinois.edu/>

email address: zaher@illinois.edu

**Describe the types of collaborations you are seeking (people, data, etc.):**

Looking for collaborators who study epidemiology and propagation of contagious diseases (especially with an eye on understanding/informing mitigation strategies).

The hope is that combining insights from cascade propagation in different domains (I study contagion in the information domain), we can develop better mitigation tools and algorithms.

**Proposal topic/research idea:**

Current social distancing measures (such as shelter in place) are economically unsustainable in the long term. Yet, no models presently exist to help understand the implications of possible relaxation options of current measures. I would like to develop such models by leveraging an analogy with information propagation on social media. The outcome will be prediction algorithms for COVID-19 contagion trends, by geographic region, that allow executing “what if” scenarios to understand the effects of potential policy decisions.



Name: Carlo Graziani  
Department: Argonne MCS/UChicago  
Webpage: <https://www.anl.gov/profile/carlo-j-graziani>  
email address: [cgraziani@anl.gov](mailto:cgraziani@anl.gov)

## Needs:

Expertise:

1. I need a “crude but effective” mathematical model of the development of viral load in individuals (e.g. Herz et al. 1993, PNAS 93, 7247);
2. I need a “crude but effective” model of the relation of viral load to symptom susceptibility (e.g. a load threshold(?));
3. I need a “crude but effective” model of the population distribution of parameters in models 1.) and 2.) -- how are immune response and symptom-susceptibility distributed?

Data: Actual RT-PCR test Ct numbers (not just “positive/negative”), as proxies for viral load.

## Proposal topic/research idea:

RT-PCR testing data for SARS-Cov-2 in the U.S. gives a highly biased view of the epidemic:

- Only individuals with symptoms are tested. This population is quite different from the general infected population;
- The incubation period of COVID-19 is 2-11 days. A positive test today reflects an infection that occurred in the past. In the meantime, the epidemic has progressed.

A Bayesian/MCMC approach can model these biases, thereby seeing through them to infer SIR/SEIR epidemic model parameters (such as the current value of  $R_0$ ). This approach could complement serology in assessments of herd immunity.

Name: Eliu Huerta

Department: NCSA/Center for AI Innovation

Webpage: <https://eliuhe.wixsite.com/eliu>

email address: [eliu@illinois.edu](mailto:eliu@illinois.edu)

**Describe the types of collaborations you are seeking (people, data, etc.):**

epidemiologists that may inform the construction of a dictionary of keywords to design domain-inspired AI tools to learn about infection patterns and its correlation with levels of immunity, environmental effects, etc.

**Proposal topic/research idea:**

- 2-step idea:
  - dictionary of keywords, data curation and production of AI tools for name entity recognition
  - curation of relational data base, production of AI tools to identify available data on patient ↔ drugs ↔ pathogen on scientific journals and other available data

**Eleftheria Kontou**, Assistant Professor, Civil & Environmental Engineering

Webpage: <https://publish.illinois.edu/kontou/home/>

email address: [kontou@illinois.edu](mailto:kontou@illinois.edu)

- **Describe the types of collaborations you are seeking (people, data, etc.):**

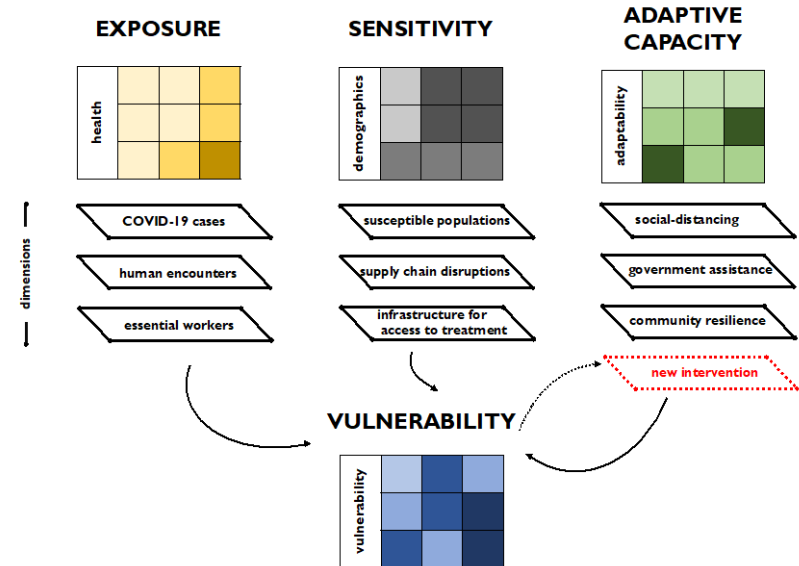
- Machine learning
- Epidemiology

- **Expected data use**

- C3.ai DTI epidemiological data
- Socio-demographics (Census)
- Policy levers & their timelines
- Infrastructure & accessibility (DHS)
- Supply chain disruptions

- **Proposal topic/research idea:**

- ML for vulnerability modeling to COVID-19
  - health and economic impacts



Name: Jessica Li  
Department: EPOL  
Webpage: <https://education.illinois.edu/faculty/jessica-li#tab2>  
email address: [jli2011@illinois.edu](mailto:jli2011@illinois.edu)

**Describe the types of collaborations you are seeking (people, data, etc.):**

- Data sets that connects the need and the supply (people in need and volunteers/volunteer organizations)
- Platform that can be used to collect data?
- AI and Data scientist
- Social scientist
- Psychologist
- Others

**Proposal topic: The utilization of volunteers, an important human resource in time of needs**  
**Research idea: Volunteerism has a significant impact on society, it exhibits the altruistic nature of human interaction. It benefits the people who provide the services and the people who receive them. However, the opportunities to provide and receive volunteer services are often not well managed and lack of coherence, especially in times of emergencies, such as the Coronavirus pandemic. Hence, the need is there for a platform and data-driven solution to address this issue. Potential RQs: 1) What factors should be considered in the effective matching of service provider and service receiver? 2) Would there be differences in times of response and recovery? How it may impact the future of volunteer organizations?**

Name: Lavanya Marla

Department: ISE

Webpage: <https://publish.illinois.edu/lavanyam/>

email address: lavanyam@Illinois.edu

**Describe the types of collaborations you are seeking (people, data, etc.):**

- ML/AI researchers for big data computations
- Epidemiologists/serotologists to describe the schedule of detecting immunity

**Proposal topic/research idea:**

- Exploring herd immunity to facilitate reopening the economy
  - Collaborative techniques that multiple logistics providers can explore to jointly operate with fewer 'immune' humans in the system
- Network demand management (information release) techniques to manage people entering hospitals in a network
- Supply management techniques (schedules) at hospitals (masks/kits) and doctors – inventory management with the bottleneck analyses (queueing)

Name: Michel Regenwetter

Dept: Psychology (Poli. Sci., ECE)

Webpage: [psychology.illinois.edu/directory/profile/regenwet](https://psychology.illinois.edu/directory/profile/regenwet)

Email address: regenwet@illinois.edu

### Looking for partners with expertise in

- Large scale survey and experiment data collection from participants who are registered and paid, and whose data need to be de-identified.
- Expertise in large scale, on-the-fly database generation for sharing w. scholars and/or public.
- (Longer term?) Behavioral science gateway development that allows
  - scholars / healthcare organizations to join the study with their own participants,
  - researchers to contribute survey questions, experimental stimuli,
  - scholars to filter and search database for data they want to analyze.

### Regenwetter lab joint with OSF Healthcare

#### Large-scale behavioral study: Covid-19 & beyond

- **Domains of inquiry:** Knowledge (risk literacy, health literacy), beliefs, reasoning, moral and ethical judgment, attitudes towards policies.
- **Quantitative behavioral analyses** ranging from individual to collective behavior & consensus.
- **Comparison** of health professionals with healthy, sick, recovered patients.
- **Adaptive** longitudinal data collection.
- **Generate** huge de-identified behavioral database for scholars worldwide to study.
- **Expand** to behavioral science gateway for world-wide use.

Name: Lu Tang  
Department: Biostatistics (University of Pittsburgh)  
Webpage: <https://www.publichealth.pitt.edu/home/directory/lu-tang>  
email address: lutang@pitt.edu

**Describe the types of collaborations you are seeking (people, data, etc.):**

- I am a trained biostatistician with expertise on statistical modeling. I am seeking collaborators with:
  - Expertise on creating online platform for training models. For example, creating connection to cloud computing server, and building front-end connection to modeling (e.g., an R shiny app).
  - Expertise on automated data collection (web page scraping) from online sources and automated model updating.
- Data used: county-level or regional-level summary data of infection, recovery, and death, hospital resources.

**Proposal topic/research idea:**

- Quantifying the effect of intervention (i.e., different quarantine protocols) and its uncertainty in epidemiological models (for example, SIR modeling). These models will allow us to make prediction into the future and help inform important change points in the course of disease outbreak. The results will be useful for advising policy makers.
- Tools developed can be used by other groups with similar data.

Name: Weina Wang and Lei Ying

Department/Univ: Carnegie Mellon University and University of Michigan

Webpage: <http://www.cs.cmu.edu/~weinaw/>, <https://leiying.engin.umich.edu/>

email address: [weinaw@cs.cmu.edu](mailto:weinaw@cs.cmu.edu), [leiying@umich.edu](mailto:leiying@umich.edu)

## Looking for:

Domain expertise in epidemiology

## Project ideas:

- new transmission model
  - Time-series model that exploits correlation among locations
- resource-constrained testing
- adaptive interventions
  - Reduce economic impact without overloading health care systems



Name: Bertram Ludaescher

Department: School of Information Sciences (& NCSA & CS)

email address: ludaesch@Illinois.edu

- **Describe the types of collaborations you are seeking (people, data, etc.):**

- Experts in 3D protein structures, esp.
- protein-ligand interactions,
- structure-based drug discovery and structural biology
- ...

- **Proposal topic/research idea:**

Tool development to support drug repurposing by linking & integrating information from

- 3D protein structure,
- observed ligand binding sites, and
- the biomedical literature

using machine learning and knowledge graph construction.

## Interdisciplinary Project on Arts and Humanities

Idea: To create

(1) a data-based analysis of the long-term effects of the COVID-19 pandemic on the production and dissemination of art, literature, and humanistic branches of knowledge throughout the world and

(2) models for preserving and innovating methods for continuing creativity, teaching, and research under conditions of extreme isolation and quarantine that may come in future.

**PIs: Rini B. Mehta (CWL & NCSA), Kalina Borkiewicz (AVL, NCSA)**

Looking for:

Collaborators with

- (1) Strong machine-learning expertise
- (2) Experience in analyzing and modeling social media
- (3) Interest in visualization and propagation of art objects (texts, images)

Name: Yi Lu  
Department: Chemistry  
Webpage: <http://lulab.scs.illinois.edu/>  
email address: yi-lu@illinois.edu

**Describe the types of collaborations you are seeking (people, data, etc.):**

We are looking for collaborators with expertise in machine learning (ML), artificial intelligence (AI) or the internet of things (IoT) who are interested in collaboration with my group on transforming the **data on COVID-19 infect-ability or transmissibility** we can collect using smartphone-based biosensors (see my group's expertise in the next item) of patients and surfaces in public places into data in cloud and analyzing them using AI algorithm.

A major issue we are addressing is **lack of quality data** on the transmissibility of COVID-19, as current diagnostic tests (e.g., RT-PCR) cannot inform infect-ability or transmissibility. Without high-quality data, the ML/AI/IoT results will not be as accurate or powerful.

**Proposal topic/research idea:**

While many COVID-19 diagnostic tests have been developed and used, few test, if any, can inform infect-ability (i.e., whether the SARS-Cov-2, the virus that causes COVID-19 is infectious or not). We have developed a method for rapid, direct and portable detection of viruses that can inform **infectability of the virus** of both samples in patients and surfaces in public places (e.g., hospitals, airports & grocery stores). When interfaced with smartphones, the info about viral transmissibility will allow cloud-based ML/AI analyses to inform actions for current COVID-19 and future viral outbreak.

This work fits **Topic 1** (Applying ML/AI methods to mitigate the spread of the COVID-19 pandemic) and **Topic 7** (Rigorous approaches to designing sampling and testing strategies)