

CS6150

Computing

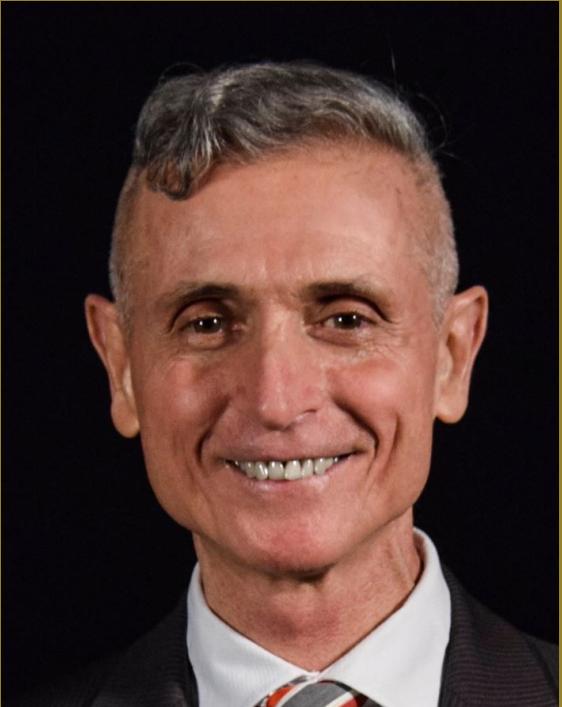
for Good

(C4G)



Santosh Vempala joined the College of Computing in the fall of 2006 as a professor of Computer Science. He helped set up the Algorithms and Randomness Center and ThinkTank at Georgia Tech, serving as its first director (2006--2011). Vempala's research interests include algorithms, randomness, geometry and computing-for-good (C4G). He graduated from CMU in 1997 being advised by Avrim Blum and then taught at MIT until 2006 except for a year as a Miller Fellow at UC Berkeley. Vempala is also a Sloan, Guggenheim, ACM and generally excitable Fellow, especially when a phenomenon that appears complex from one perspective, turns out to be simple from another. In recent years, he has been trying to understand, with little success, how the brain works and how to model its computational abilities.

Instructor: **Santosh Vempala**



Dante Ciolfi became an instructional associate in the College of Computing in 2021. Ciolfi earned his Master's in Computer Science from Georgia Tech's OMSCS Program in 2020. He received his MEd from Florida Gulf Coast University in 2008. He has taught computer science and Web development since the mid 1990s when he heard about this new thing called the Internet. Ciolfi's long-term interest in computing education equity and AI algorithmic transparency fueled him as founder and content creator for the Computing Center for Social Good, a 501(c)(3) that provides free AI internships to students and career changers. These folks, in turn, provide computing services to nonprofits. Ciolfi loves all forms of life - organic, digital, and hybrid.

Instructional Assistant: **Dante Ciolfi**

C4G at GT

Computing for Good (C4G) at Georgia Tech



An initiative to **apply computing ideas** to societal problems



A **project-based** course



Projects often run **beyond the course**



Projects aim to make a **positive and sustainable impact on society**.

Computing for Good (C4G) at Georgia Tech



Started as a course in **2008**.
The **first edition** was **taught by**:



Ellen
Zegura



Michael
Best



Santosh
Vempala

Georgia Institute of Technology

Georgia Tech is one of the **top public research universities in the US**, distinguished by its commitment to **improving the human condition** through **advances in science and technology**.



C4G Project Examples

C4G Project Examples

- ◆ Homeless Shelter Occupancy System
- ◆ OPEACE
- ◆ LifeNet
- ◆ Vein-to-Vein



Homeless Shelter Occupancy System with United Way Atlanta



<https://www.unitedwayatlanta.org/>

OPEACE: Education portal for an afterschool program in a low- income neighborhood



<http://www.operationpeace.org/>

C4G Project Examples

LifeNet

- ◆ Robust **communication system** for disaster-affected or poorly connected areas
- ◆ Supports **ad hoc mobile communication** using standard phones, laptops and routers, by **turning each device into a router** and using an efficient mobile routing protocol
- ◆ **Lead developers:** Hrushi Mehendale and Ashwin Paranjpe, former C4G students



<https://github.com/hrushim/LifeNet/blob/master/README>

Vein-to-Vein

- ◆ **Blood safety monitoring system** developed with the CDC and National Blood Transfusion Services in Zambia and Namibia. Later spun off to the African Society for Blood Safety and Jembi Health Systems
- ◆ The **system tracks blood** from the point of collection to the point of infusion, keeping track of all aspects of blood safety.
- ◆ **Lead Developer:** Rohit Banga, former C4G student.



 jembi

<https://github.com/C4G/V2V/blob/master/README.md>

[https://www.jembi.org/Project/Blood-Safety-Strengthening-Programme-\(BSSP\)](https://www.jembi.org/Project/Blood-Safety-Strengthening-Programme-(BSSP))

C4G BLIS & Effectiveness

C4G

=

Computing for Good

BLIS

=

Basic Laboratory Information System

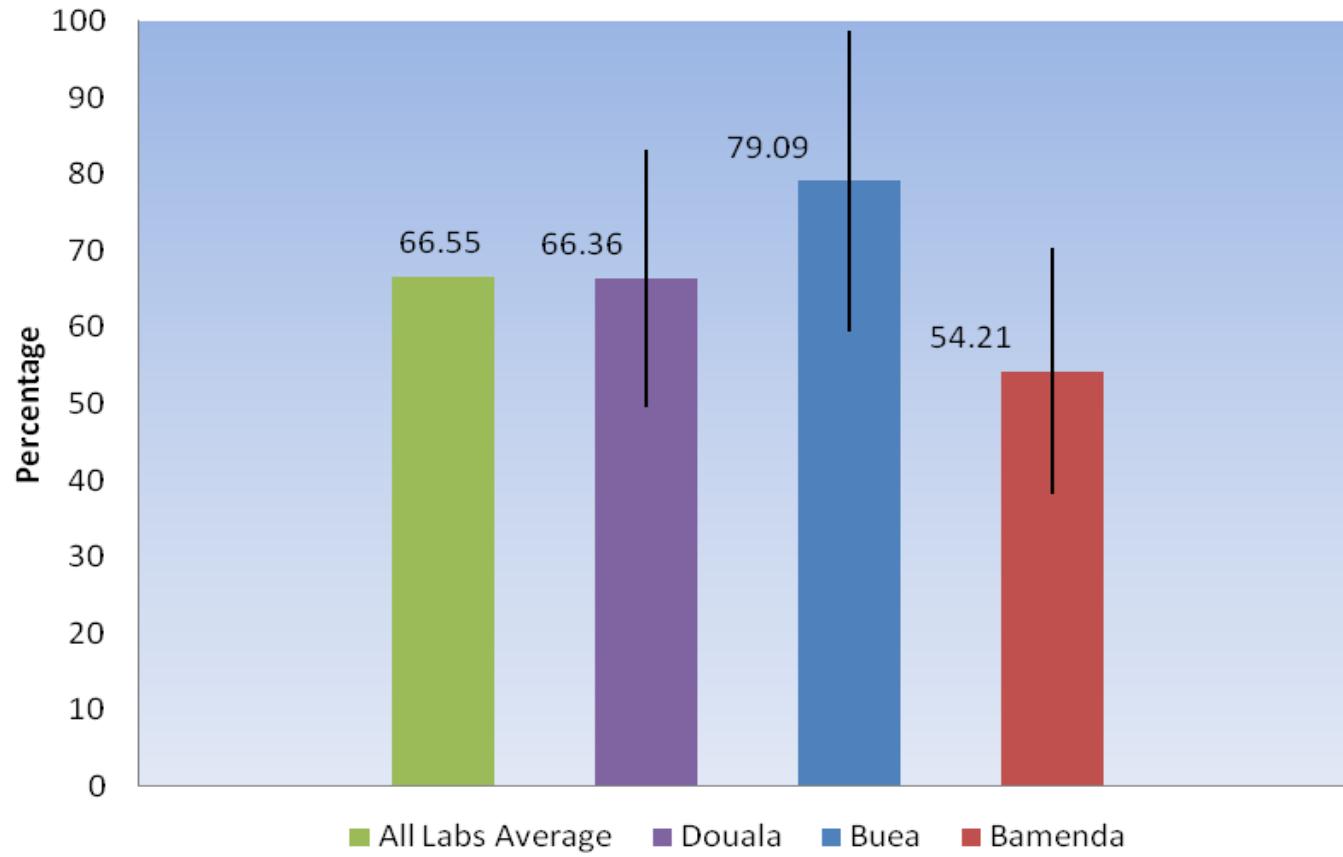
How **effective** is it?



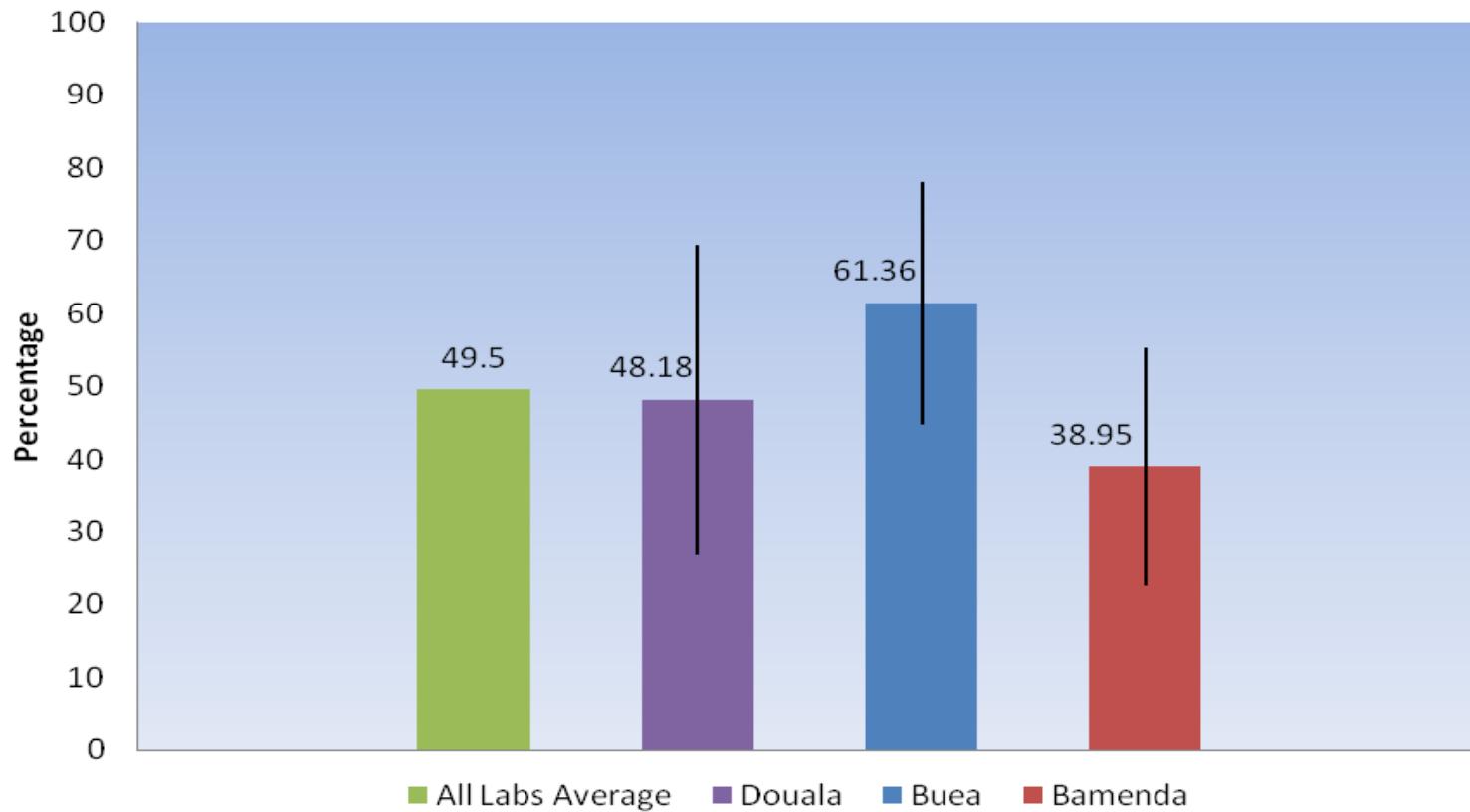
*Very effective,
so far!*

Sources:

- ◆ Pilot study: Sept. – Oct. 2010
- ◆ User survey: April 2013
- ◆ Laboratory data analysis
(ongoing)



Error Reduction



Workload Reduction

Project Status & Background Info



Very effective so far:

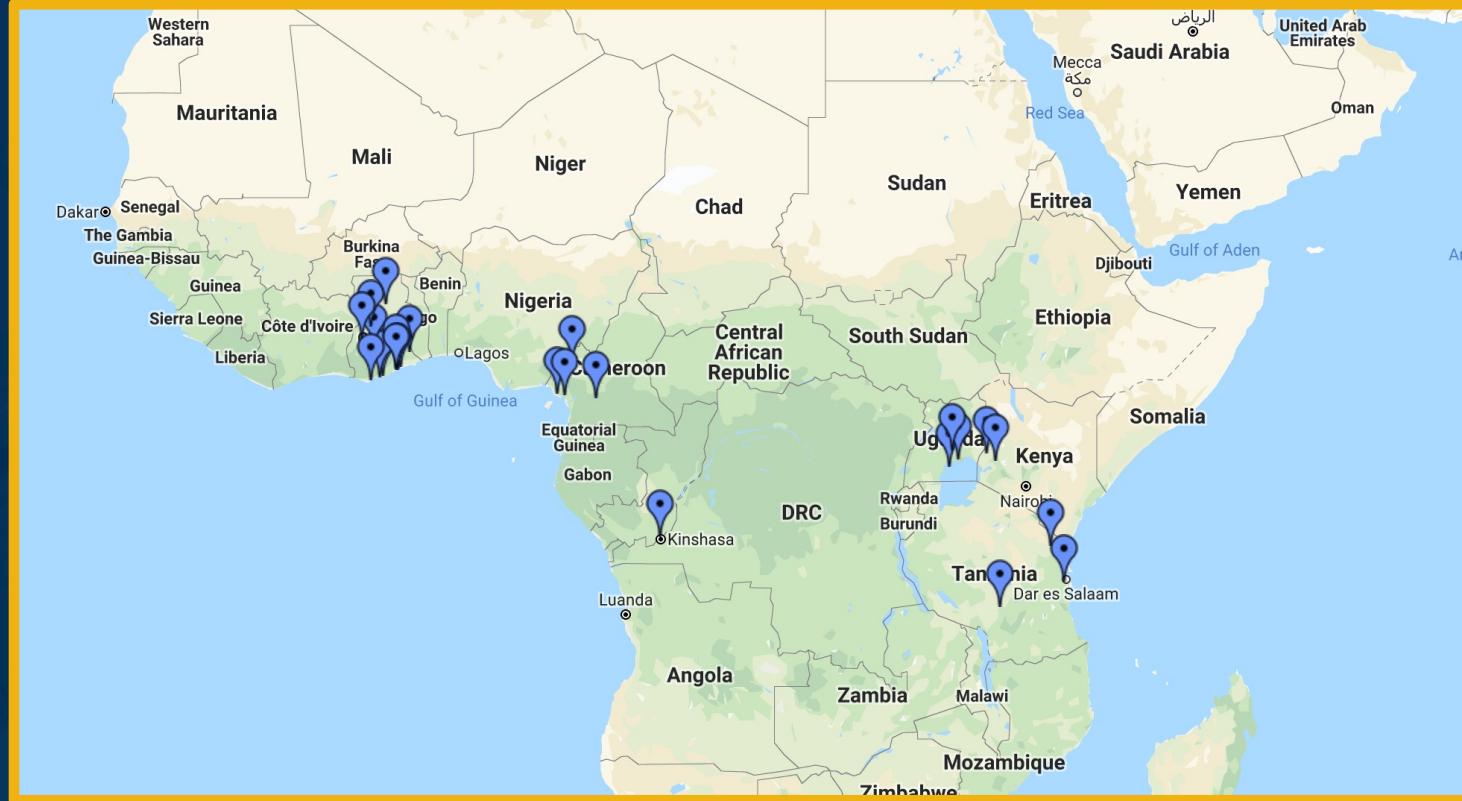
- ◆ Daily use in 12+ countries, 100+ hospital laboratories
- ◆ Continuously used since deployment
- ◆ Started in 3 labs in May 2010



A lot more work remains!

- ◆ Number of hospital labs in sub-Saharan Africa is greater than 1500 (including smaller district level labs)

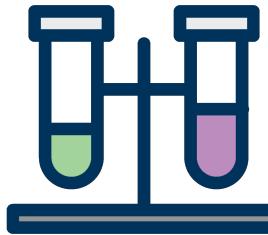
12+ Countries, 100+ hospitals including:



Project Deployment



Laboratory receives specimens



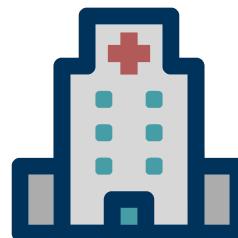
Specimen has a type, source, and prescribed set of tests



Schedules and conducts tests



Records results



Reports them to patients & doctors



Reports / monitors aggregate data & trends

What does a Laboratory do?

Laboratories



Come in **many shapes and sizes!**

Parameters that vary include:

- ◆ Types of tests conducted, volume of tests
- ◆ Availability of power, internet, computers
- ◆ Background / expectations of technicians / doctors
- ◆ Lab workflow
- ◆ Lab terminology
- ◆ Language!



Thank You!

CDC

- ◆ John Nkengasong, Mark DeZalia, David Cross, Sherry Orloff, Amitabh Adhikari, Heather Alexander, Xen Santas

Cameroon

- ◆ Dr. Patrick Njukeng, Sidney Atah, Elive Ngale, Eric Nzeko, Beatrice Mangwa
- ◆ Dr. Judith Shang (CDC), Dr. Maurice Mouladje, Dr. Madeline Mbangue, Franklin Chi

Uganda

- ◆ Anthony Kimuli, Emma Papa, Victor Kazibwe, Eddie Kiyegga (AFENET)

Tanzania

- ◆ Mercy Maeda (AFENET), Dr. Fausta Mosha (MoH)

Ghana

- ◆ Philip Boakye (GHSS), Stephen Adjei-Kwei

And many others!

Thank You!

And to the C4G development team:

- ◆ Ruban Monu (MS CS 2010)
- ◆ Hiral Modi (MS CS 2011)
- ◆ Akshay Phalnikar (MS CS 2011)
- ◆ Amol Shintre (MS CS 2012)
- ◆ Naomi Chopra (MS CS 2013)
- ◆ Rohit Banga (MS CS 2013)
- ◆ Robert Thackston (B.S. 2013)
- ◆ G K Arun Kumar (MS CS 2014)
- ◆ Madhavan Murrali (MS CS 2015)
- ◆ Aishwarya Rajagopal (MS CS 2015)
- ◆ Vasavi Gajarla (MS CS 2016)
- ◆ Dhruv Muttaraju (MS CS 2017)
- ◆ Sakshi Gandhi (MS CS 2017)
- ◆ Aditi Shah (MS CS 2019)



Thank You!