



# Computer Vision for **Global Challenges**

Learnings from the 1st CV4GC Workshop @ CVPR 2019

Laura Sevilla-Lara  
Yannis Kalantidis

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# Computer Vision for **Global Challenges**

## Computer Vision Research



✓ **Commercial applications**

Does not serve the whole world

✗ **Often suffer from *bias*:  
data, tasks, etc.**

## The Real World



✗ **Unexplored problems with high impact**

✓ **Access to electricity, internet,  
smartphones**

✓ **Amazing talent**

# Computer Vision for **Global Challenges**

## Goals

- 1) Broaden the scope of computer vision tasks, problems, datasets
- 2) Identify computer vision techniques that can help solve problems with large positive societal impact in the Global South
- 3) Give individuals, universities and organizations the ability to contribute to the previous two goals

# Computer Vision for **Global Challenges**

## **How to reach those goals?**

Step 1: CVPR Workshop

Bring all sides together, learn, communicate

Read more at the [Facebook AI “Computer vision and global challenges: New research and applications” blog post](#)

# Computer Vision for **Global Challenges**



# Computer Vision for **Global Challenges**

Call for global challenges

International development cohort @ CVPR

Call for papers

Call for proposals

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# Computer Vision for Global Challenges

## Call for Challenges

- 105 applications
  - 17 selected (16%)
    - Full travel grants
    - CV Ambassador
    - Compute Credits
- donated by



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# Computer Vision for **Global Challenges**

## Health

- **A rapid malaria diagnosis test using a mobile phone.**  
*Martha Shaka* (The University of Dodoma, Tanzania)
- **Early Detection and Diagnosis of Breast Cancer**  
*Maleika Heenaye-Mamode Khan* (University of Mauritius, Mauritius)
- **Towards Detecting Dyslexia in Handwriting**  
*Katie Spoon* (Indiana University Bloomington, USA)
- **"Bytes against bites": First AI-based app for snakebite management**  
*Rafael Ruiz de Castañeda* (University of Geneva, Switzerland)
- **Computer Vision for Childbirth Progression Monitoring: Cervical Dilation Assessment**  
*Temitope Oluwatosin Takpor* (Covenant University, Nigeria)

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## Agriculture

- **Smartphone-based application for the identification of diseases in crops**  
Ariolfo Camacho Velasco (Universidad Industrial de Santander, Colombia)
- **CareGreenUnit and CareGreenMonitoring system: AI Support Decision Making System in Smart Agriculture**  
Azeddine EL HASSOUNY (Mohammed V University in Rabat, Morocco)
- **Intelligent Crop Health and Pest Detection**  
Mohsen Ali (Information Technology University, Pakistan)
- **A Computer Vision Tomato Pest Assessment and Prediction Tool**  
Denis Pastory Rubanga (Tokyo University of Agriculture, Japan)
- **Inferring Crop Pests and Diseases from Image Soil Data and Soil Properties**  
Claire Babirye (Uganda Technology and Management University, Uganda)

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## Remote Sensing

- **Eliminating Bonded Labour in Brick Kilns of South Asia**  
Murtaza Taj (Lahore University of Management Sciences, Pakistan)
- **Automatic Illegal mining detection using satellite imagery**  
Leticia Leonor Pinto Alva (Universidad Catolica San Pablo, Peru)
- **Poverty Prediction Using Satellite Imagery**  
Chaiyaphum, Siripanpornchana (NECTEC Thailand, Thailand)
- **Computer Vision for Drought Resilience**  
Andrew Hobbs (UC Davis, USA)
- **Storm Nowcasting Improvement by Machine Learning**  
Suzanna Maria Bonnet de Oliveira Martins (University of Rio de Janeiro, Brazil)

# Computer Vision for **Global Challenges**

## **Wildlife Preservation & Air Quality**

- **Automated Wildlife Monitoring, Tracking and Poacher Detection**  
Wilhelmina Ndapewa Nekoto (Dundee Precious Metals, Namibia)
- **Nowcasting Air Quality using Social Media Imagery**  
Anthony Mockler (UN Global Pulse Lab Jakarta, Indonesia)

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# Computer Vision for **Global Challenges**

## International Development Cohort @ CV4GC

Sue Marques, **Rockefeller Foundation**

Ben Pierson & Arunan Skandarajah, **Bill and Melinda Gates Foundation**

Bright Simons, **Mpedigree**

Micah Melnyk, **World Bank/Singularity**

Matt Grasser, **Bankable Frontiers Associates**

Zhuang-Fang Yi, **Development Seed**

++ experts from UNICEF, CGIAR, USAID, Slashroots, Dahlberg Design

# Computer Vision for **Global Challenges**

## Lightning talks from International Development Experts

- **Creating labeled training datasets as a way to encourage native CV applications in emerging markets.** Sue Marques, Rockefeller Foundation
- **Connected and digital health in a global perspective.** Ben Pierson and Arunan Skandarajah, Bill and Melinda Gates Foundation
- **Fighting counterfeiting of life-impacting products like medicines and agro-inputs, and securing cold-chains with CV in Africa, South Asia & Middle East.** Bright Simons, Mpedigree
- **Predicting deforestation and detecting illegal logging with CV in Chile.** Micah Melnyk, World Bank/Singularity
- **Disruptive tech for financial inclusion - or how to help East African shopkeepers manage their business?** Matt Grasser, Bankable Frontiers Associates
- **Project Connect - how to map every school in the world without data.** Zhuang-Fang Yi, Development Seed

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# Computer Vision for **Global Challenges**

## Call for Papers

24 submissions: 10 Poster and 4 Oral Presentations

### **Creating xBD: A Dataset for Assessing Building Damage from Satellite Imagery**

Ritwik Gupta, Bryce Goodman, Nirav Patel, Ricky Hosfelt, Sandra Sajeew, Eric Heim, Jigar Doshi, Keane Lucas,  
Howie Choset, Matthew Gaston

### **Deep Landscape Features for Improving Vector-borne Disease Prediction**

Nabeel Abdur Rehman, Umar Saif, Rumi Chunara

### **Does Object Recognition Work for Everyone?**

Terrance de Vries, Ishan Misra, Changhan Wang, Laurens van der Maaten

### **Infant-Prints: Fingerprints for Reducing Infant Mortality**

Joshua Engelsma, Debayan Deb, Anil Jain, Anjoo Bhatnagar, Prem Sewak Sudhish

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Call for proposals

# Computer Vision for **Global Challenges**

## Call for Proposals

- Grants of \$20-40k
- 206 applications
- Three winners
  - AnnaData: An early warning system for **crop diseases**
  - Low-cost deep learning solution to real-time detection of **malaria**
  - Portable device to analyze thick blood smears for **malaria** diagnosis

More info at the [Facebook AI Blog post](#)

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# Computer Vision for **Global Challenges**

## Invited speakers



**Raesetje Sefalai**

Wits University



**Padmanabhan Anandan**

Wadhvani AI



**Deborah Raji**

Google AI



**Ernest Mwebaze**

Google AI Accra



**Jitendra Malik**

UC Berkeley & Facebook AI



**Claudia Flores Saviaga**

West Virginia University



**Marshall Burke**

Stanford University

# Computer Vision for **Global Challenges**

**Prototyping mini-workshop** (4pm - 7pm @ Hotel Renaissance)

*Prototyping interesting CV applications that are relevant for development and humanitarian use cases*

Organized by **Anna Lerner (Facebook Project 17 team)**

Run by Daniel Steinbock, Sridhar Rao, Upendra Shardanand

# Computer Vision for **Global Challenges**

## Datasets

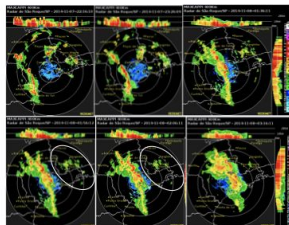
Deep Learning for Climate  
Adaptation: Detecting Drought  
from Space



TLDR – our new project helps drought resilience through deep learning on satellite images and real effects from  
The Drought Watch benchmark

Drought  
detection in  
Kenya challenge  
now public

Weather Radar  
dataset/  
challenge  
(in progress)



## Partnerships

75% attendees found  
potential collaborators

Snake-bite challenge (WHO,  
University of Geneva)



# Computer Vision for **Global Challenges**

**What's next?**

Step 2: Computer Vision for Agriculture

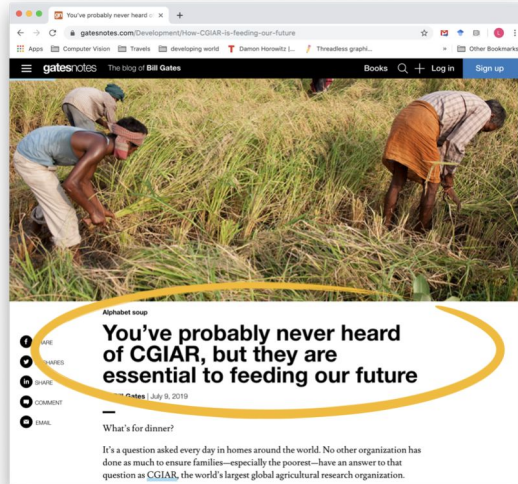
Focus more, try to solve an impactful problem

# Computer Vision for Global Challenges

## New partner: CGIAR

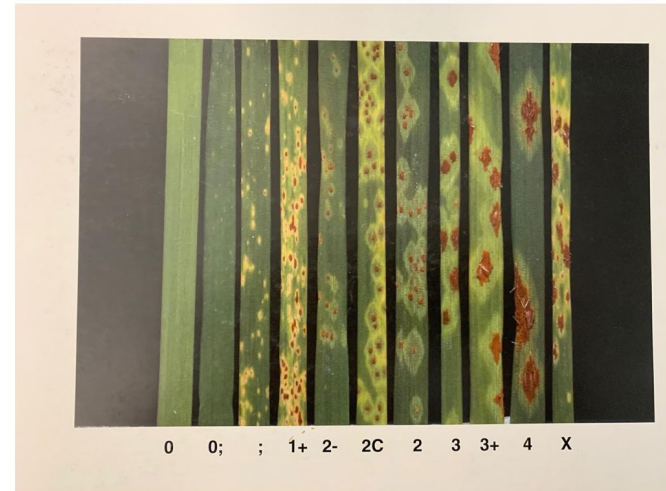
The world's largest agricultural research organization

Bill Gates posted:



## An impactful challenge

### Wheat Rust Detection and Quantification





# Computer Vision for **Global Challenges**

Thank you DSA  
for paving the  
road!

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