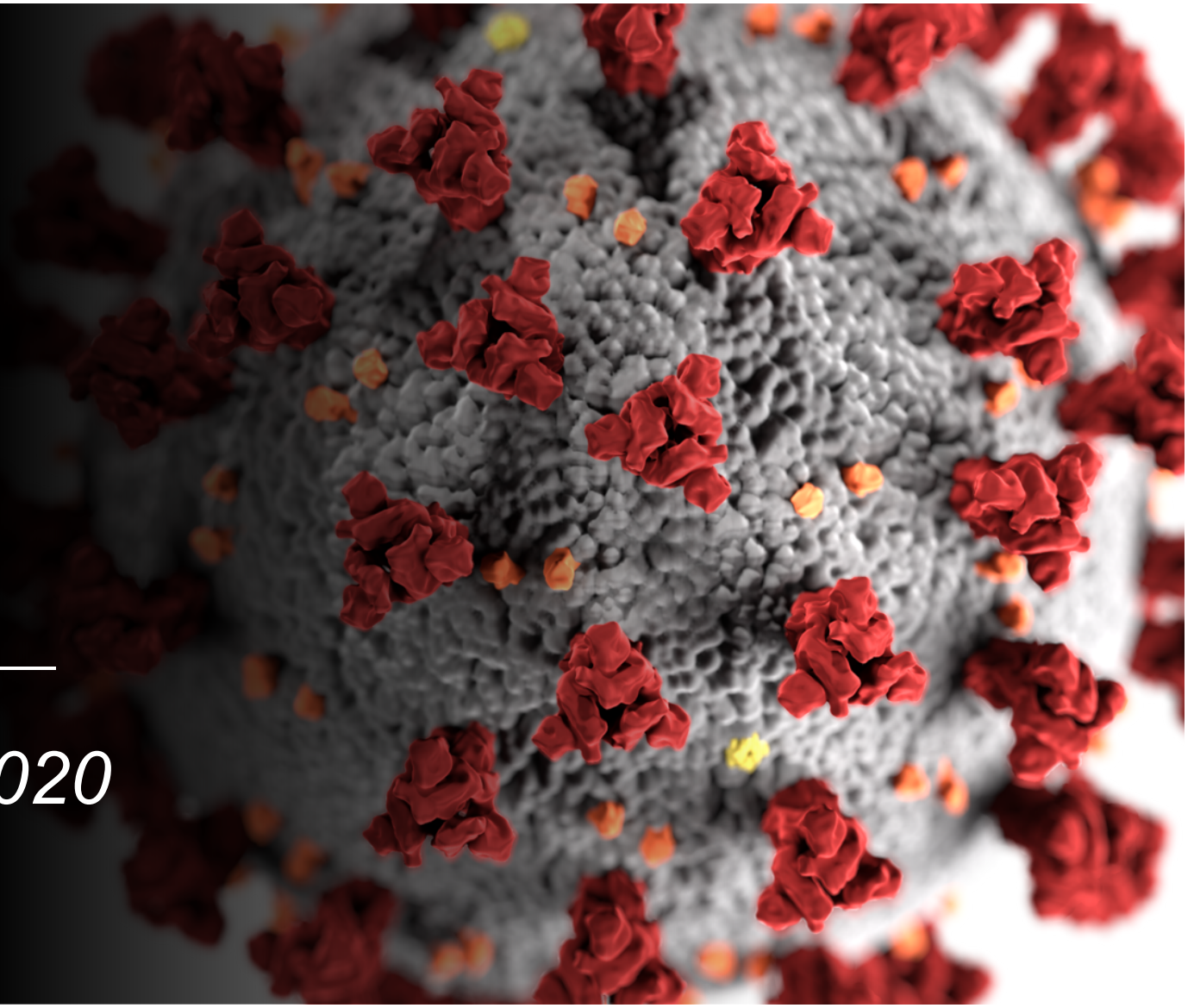
School of Earth and Space Exploration

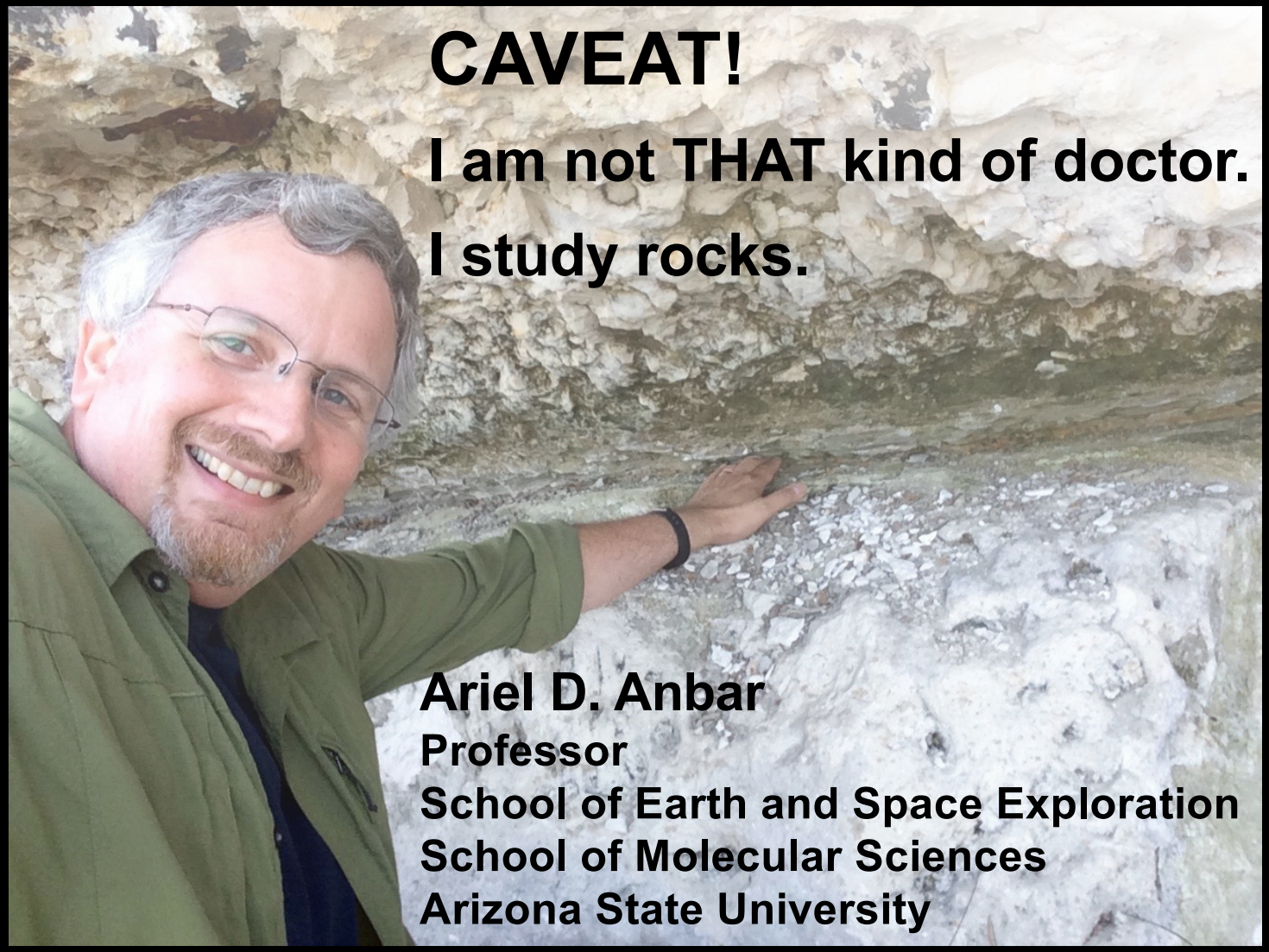
Community Conversation, April 1, 2020

- COVID-19 Crisis Update (Prof. Ariel Anbar)
- SESE Community Conversation (Director Meenakshi Wadhwa)

The COVID-19 Crisis

Update April 1 2020




CAVEAT!
I am not THAT kind of doctor.
I study rocks.
Ariel D. Anbar
Professor
School of Earth and Space Exploration
School of Molecular Sciences
Arizona State University

theguardian

World ▸ Europe US Americas Asia **Australia** Middle East Africa Inequality Global development

Australia news

Astrophysicist gets magnets stuck up nose while inventing coronavirus device

Australian Dr Daniel Reardon ended up in hospital after inserting magnets in his nostrils while building a necklace that warns you when you touch your face

- **Sign up for Guardian Australia's daily coronavirus email**
- **Follow Australia coronavirus live news and updates**
- **Follow live global coronavirus updates**

Naaman Zhou

@naamanzhou

Mon 30 Mar 2020 00.48 EDT

46,347

▲ Astrophysicist Daniel Reardon was playing around with powerful neodymium magnets while trying to make a coronavirus safety device and managed to get them stuck in his nose. Photograph: Supplied by Daniel Reardon

The danger of venturing out of your depth!

Proceed with caution…

Heartening: The speed of our response

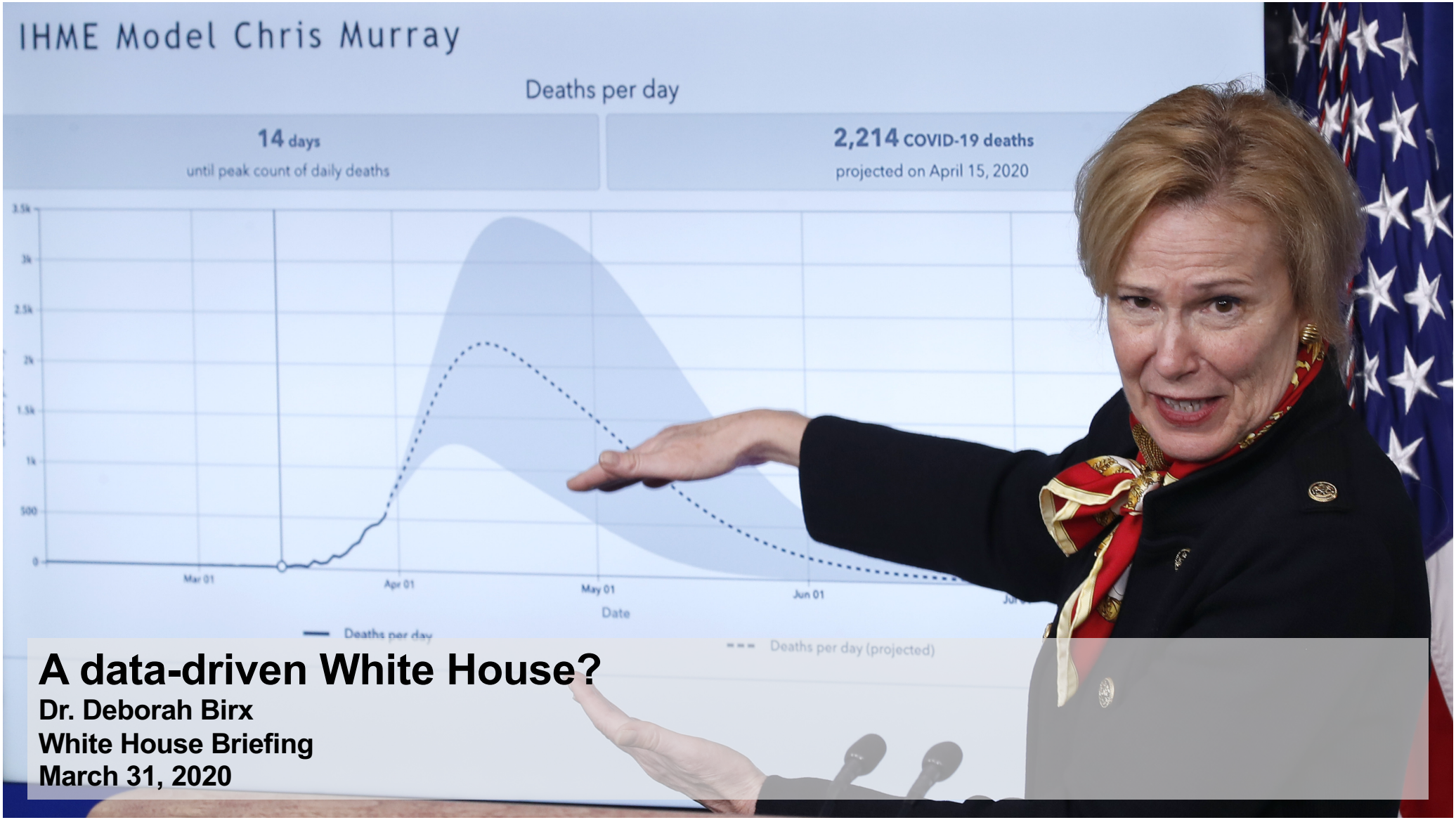
Now that we are responding, despite confusion in DC…

Alexis de Tocqueville (*Democracy in America*, 1835):

The strength of America lies in its civic institutions; we don't wait for the monarch to tell us what to do.

Winston Churchill (perhaps apocryphal):

"You can always count on Americans to do the right thing after they've tried everything else."

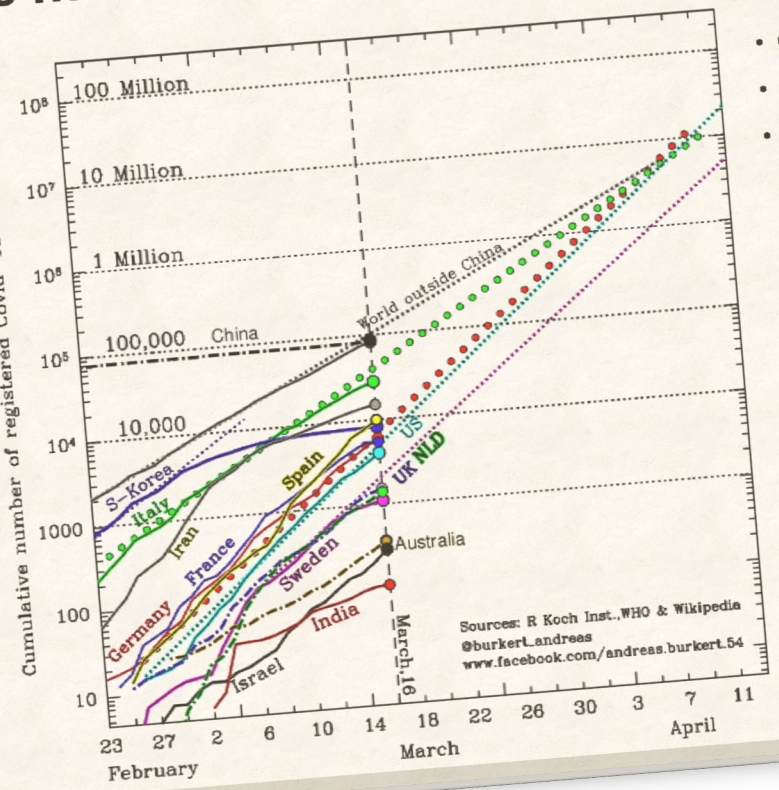


A data-driven White House?

Dr. Deborah Birx
White House Briefing
March 31, 2020

The Situation on March 18

The national situation – today and beyond



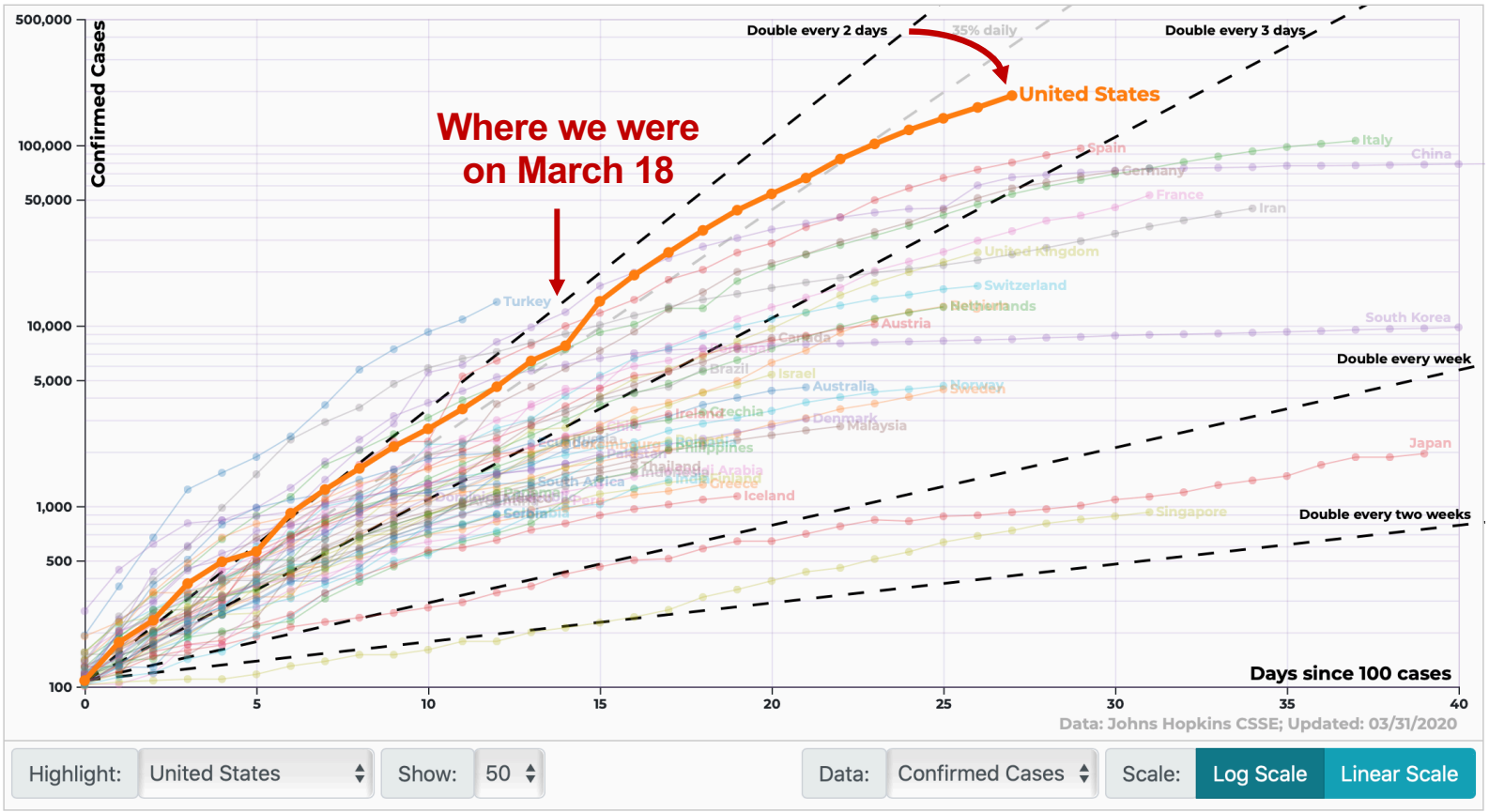
- Growth in most countries is exponential
- U.S. is doubling every ~ 3 days; like most countries
- Extrapolates to (in the U.S.):
  - 10^4 cases by this weekend
  - 10^5 cases by the end of next week
  - 10^6 cases by the end of the month
  - 10^7 cases by mid-April
- Context:
  - **Total** U.S. hospital capacity: ca. 10^6 beds
  - **Total** U.S. ICU capacity: ca. 10^5 beds

Scenario: If 10% of cases require extended hospital care, then we exceed national ICU capacity by the end of the month, and all hospital capacity two weeks later, just with COVID-19 cases. And this is based only on known infections. **This is the reason for extreme concern.**

Actual: 199,092

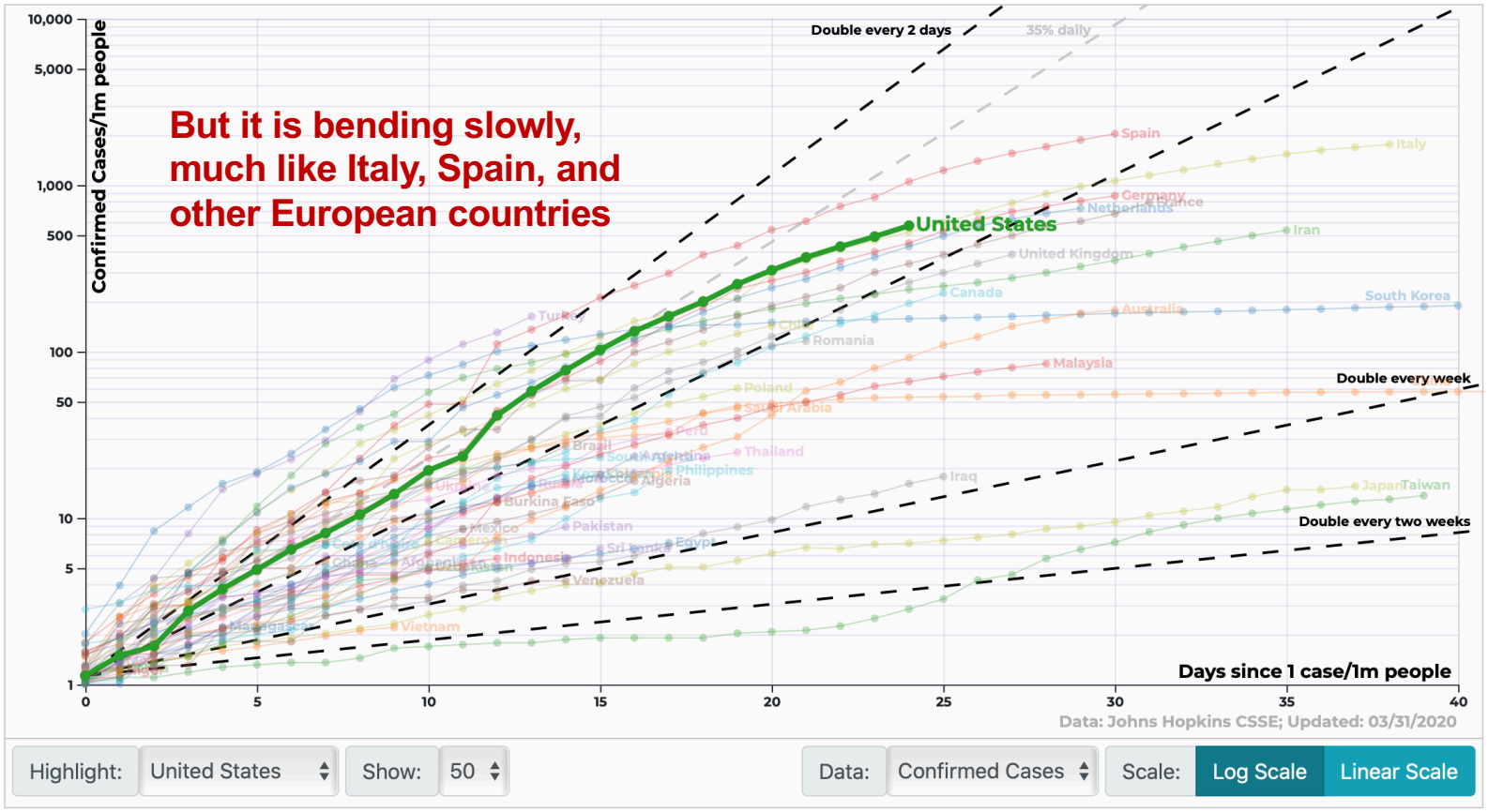
COVID-19 Cases by Country

The curve *is* bending



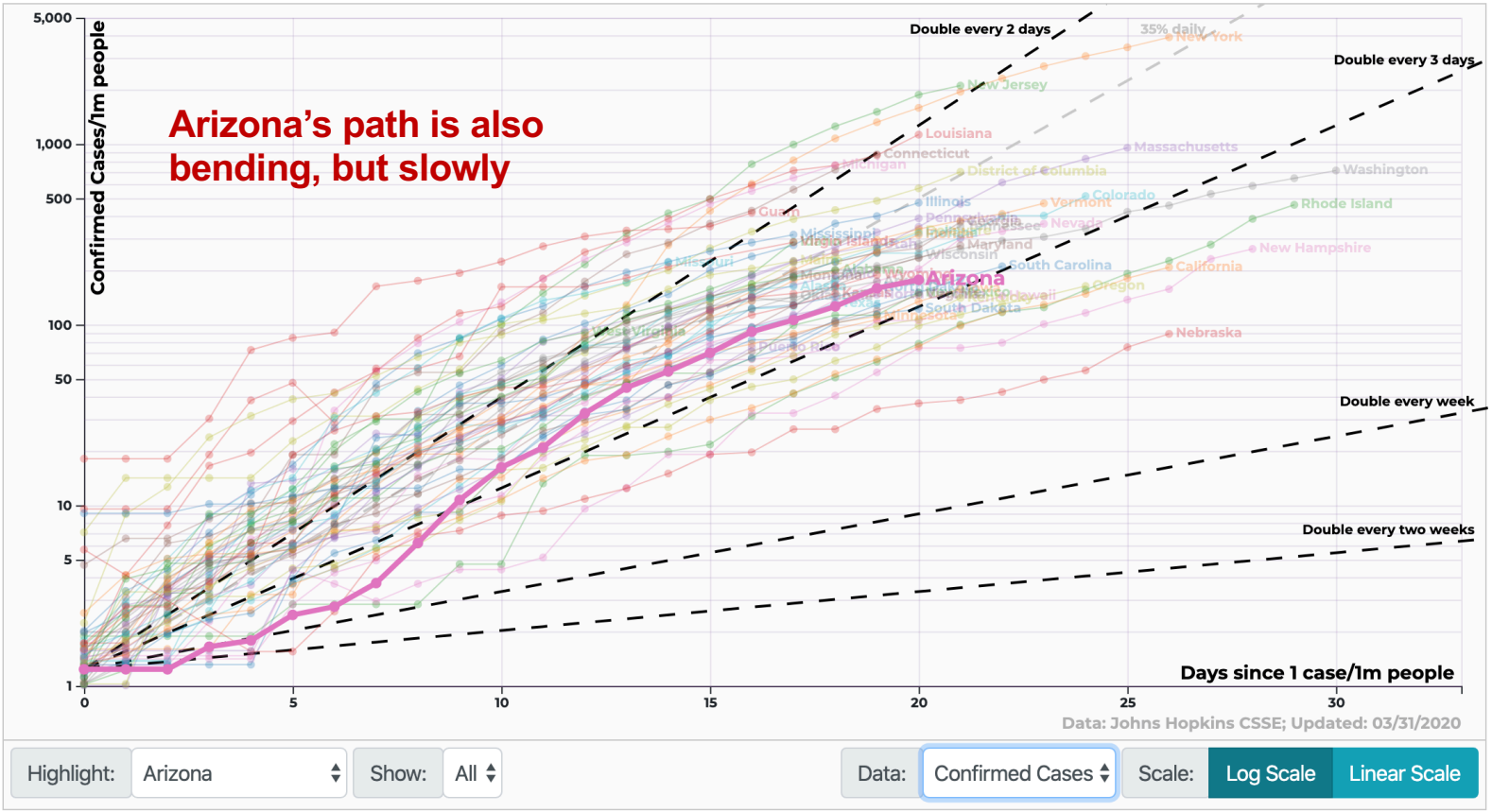
http://91-divoc.com/pages/covid-visualization/

COVID-19 Cases by Country, normalized by country population



http://91-divoc.com/pages/covid-visualization/

COVID-19 Cases by US States/Territories, normalized by population



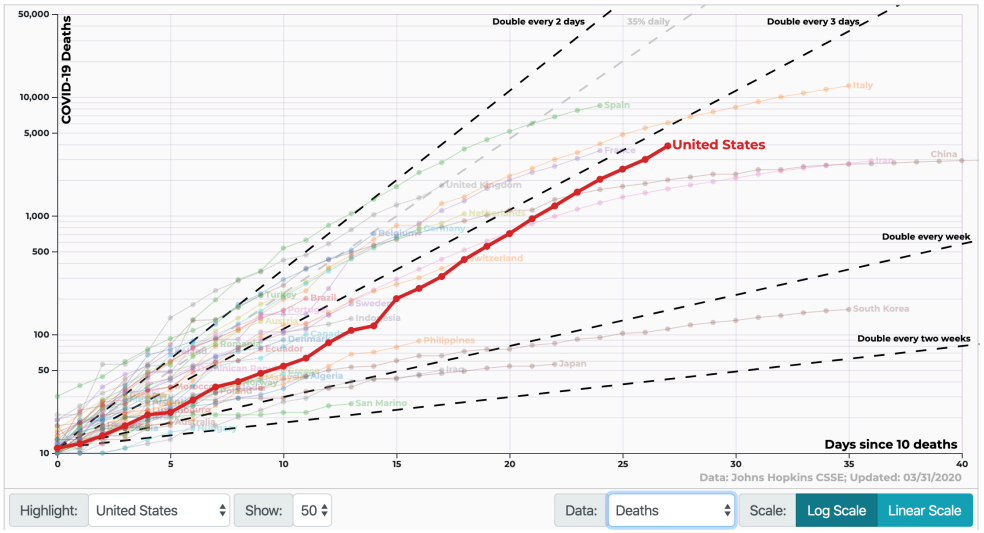
http://91-divoc.com/pages/covid-visualization/

But what are we looking at?

- Testing is biased toward those with symptoms
- Symptoms appear on average a week after infection
- Testing results delayed by a day or more
- Testing capacity may be saturated
- Tests may be inaccurate (false positives or negatives)

So don’t be complacent!

COVID-19 Cases by Country



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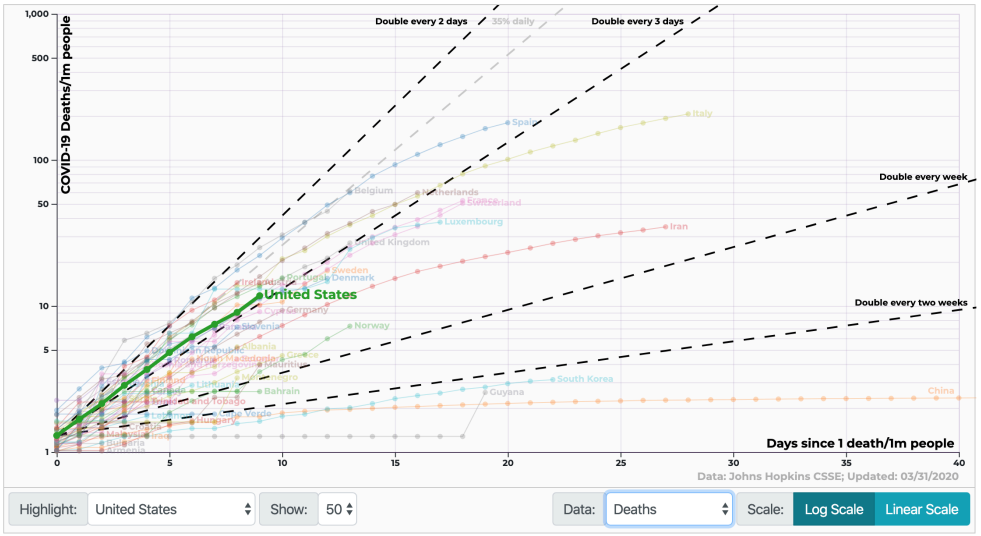


Death data

Less ambiguous but a very lagging indicator!

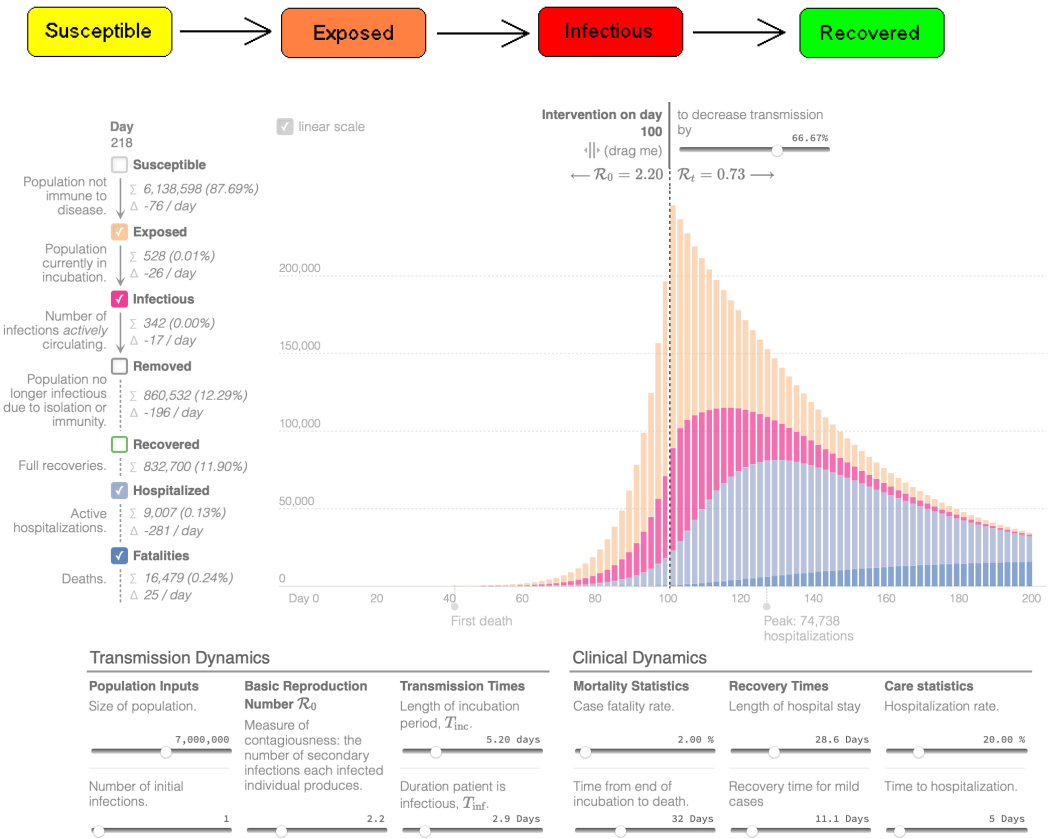
- **~ 1 wk from infection to symptoms, and ~ 2 weeks from symptoms to death (for those who die).**
- **Don't expect these to bend in US for another week!**

http://91-divoc.com/pages/covid-visualization/

Where are we headed?

Modeling Approaches

SEIR Models | classic *a priori* approach



https://gabgoh.github.io/COVID/index.html

Statistical Models | *highly empirical approach*

Forecasting COVID-19 impact on hospital bed-days, ICU-days, ventilator-days and deaths by US state in the next 4 months

IHME COVID-19 health service utilization forecasting team, Christopher JL Murray

doi: https://doi.org/10.1101/2020.03.27.20043752

"An alternative strategy is to focus on modeling the empirically observed COVID-19 population death rate curves, which directly reflect both the transmission of the virus and the case-fatality rates in each community. Deaths are likely more accurately reported than cases in settings with limited testing capacity where tests are usually prioritized for the more severely ill patients. Hospital service need is likely going to be highly correlated with deaths, given predictable disease progression probabilities by age for severe cases. In this study, we use statistical modeling to implement this approach and derive state-specific forecasts with uncertainty for deaths and for health service resource needs and compare these to available resources in the US."

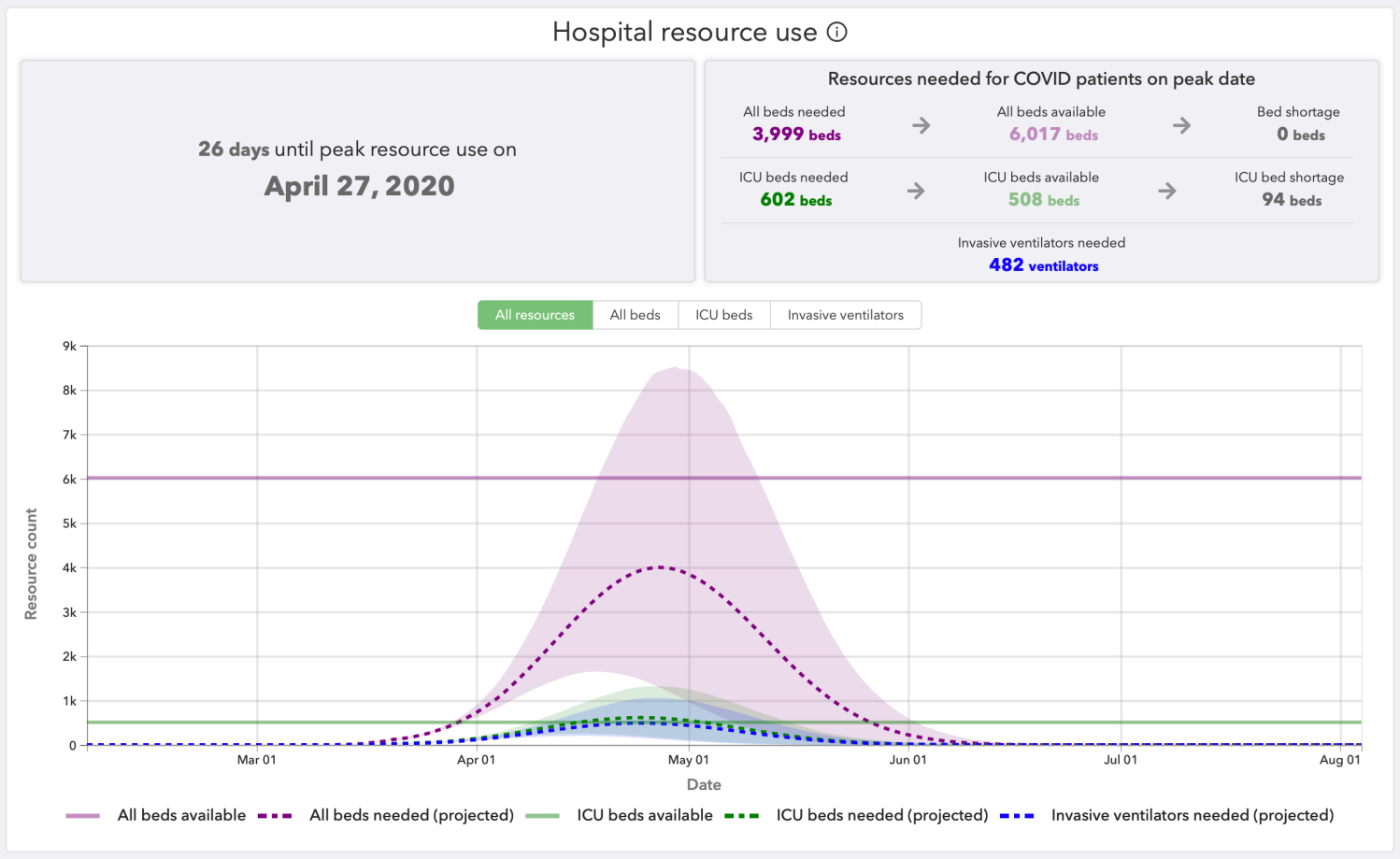
$$D(t;\alpha,\beta,p) = \frac{p}{2}\left(\Psi(\alpha(t-\beta)) = \frac{p}{2}\left(1 + \frac{2}{\sqrt{\pi}}\int_0^{\alpha(t-\beta)} \exp\left(-\tau^2\right) d\tau\right)\right.$$

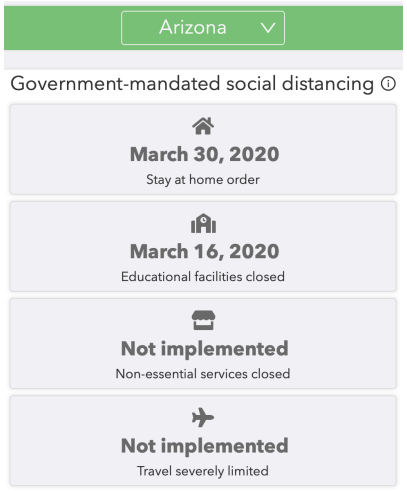
Essentially, this is curve-fitting using empirical data from location (a) to forecast the trajectory of location (b)

https://www.medrxiv.org/content/10.1101/2020.03.27.20043752v1

IHME

The Institute for Health Metrics and Evaluation (IHME) is an independent global health research center at the University of Washington.





https://covid19.healthdata.org/projections

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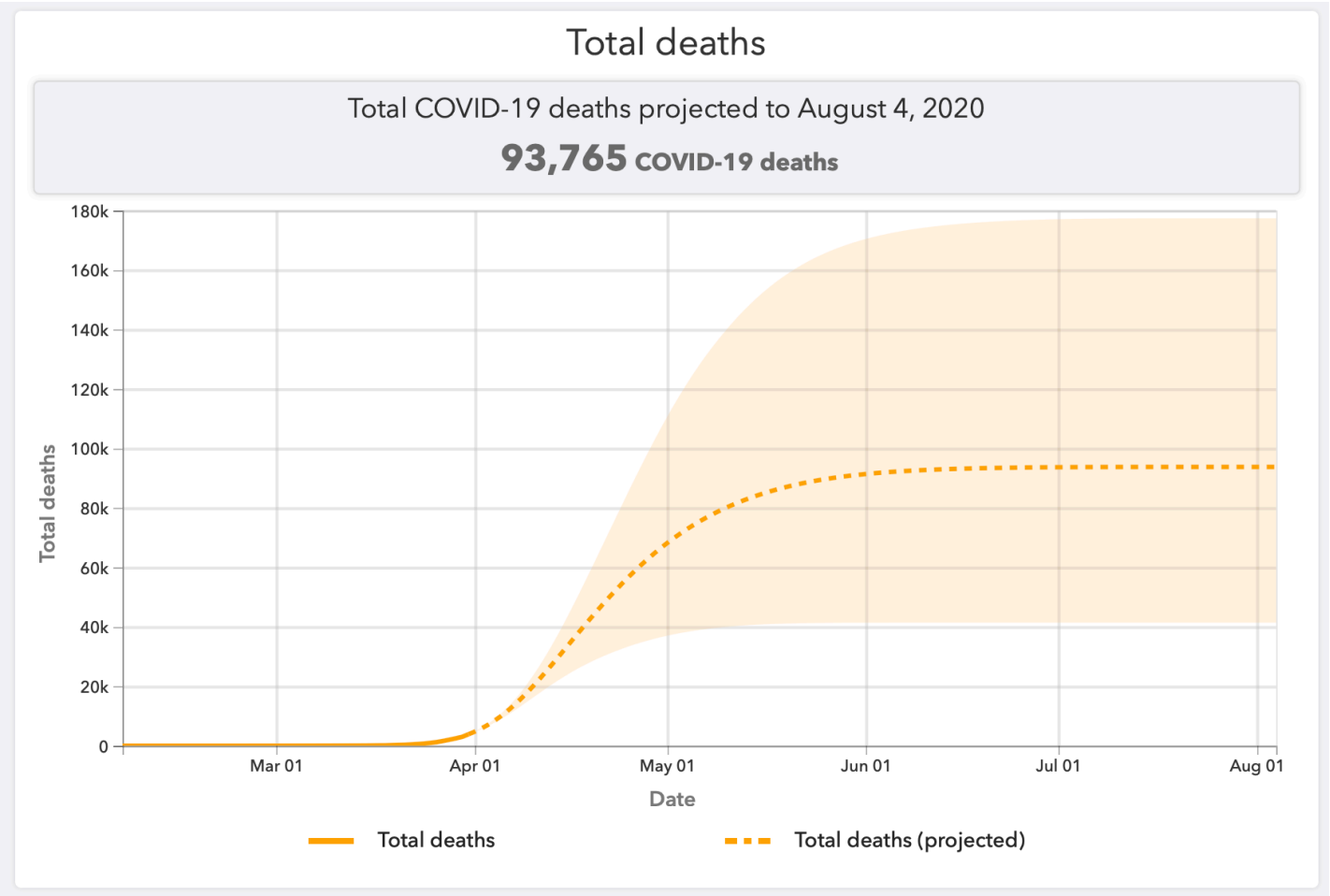


https://covid19.healthdata.org/projections

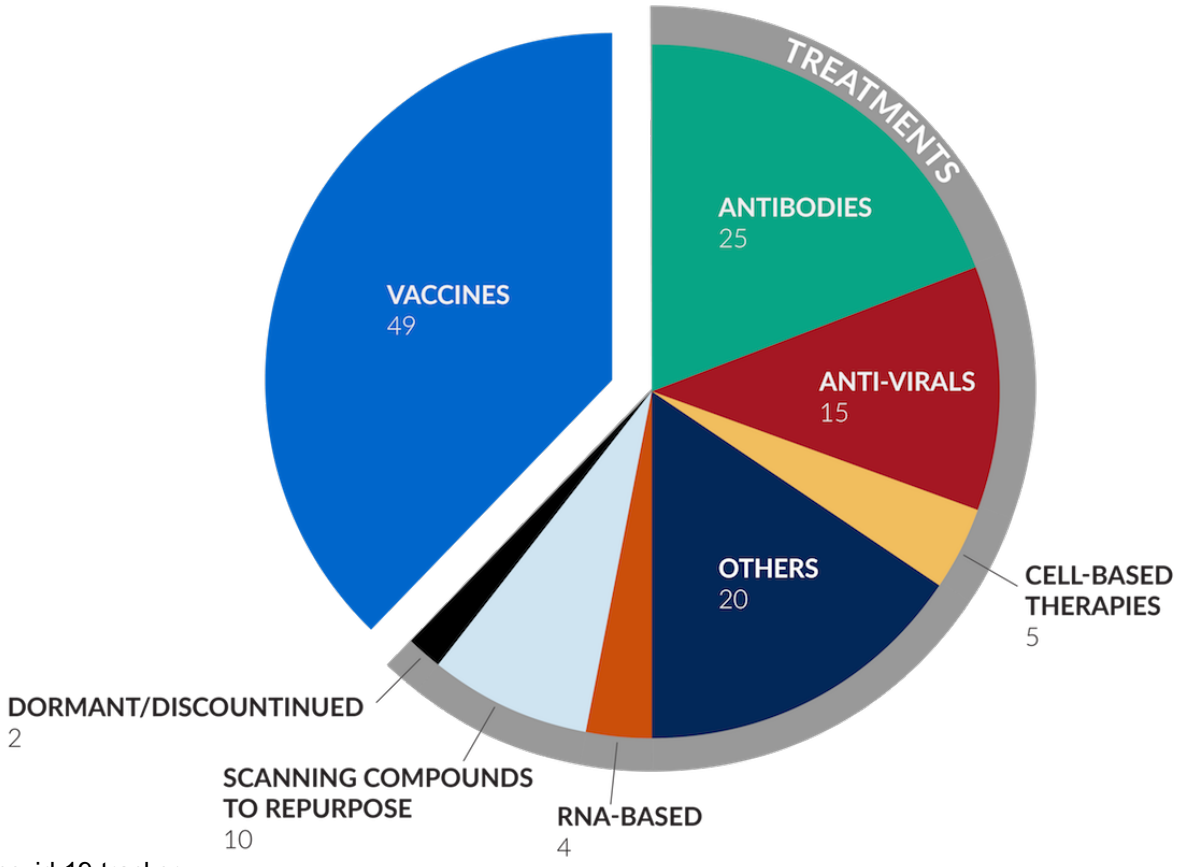
A US National model

Assumes good compliance with social distancing measures

Does not project what happens after social distancing is relaxed

MILKEN INSTITUTE

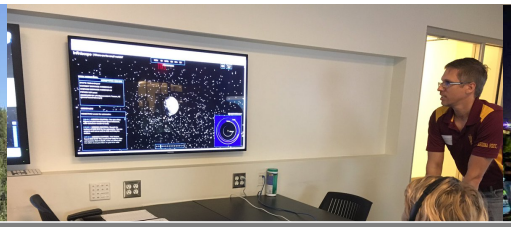
Potential COVID-19 Treatments and Vaccines in Research Pipeline



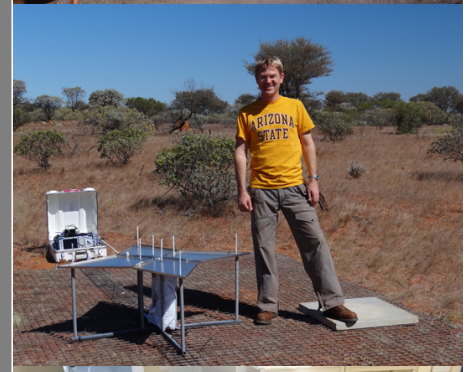
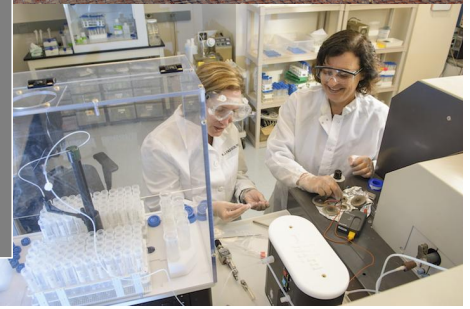
https://milkeninstitute.org/covid-19-tracker

Updated: March 31, 2020

ARIZONA
STAY-AT-HOME
ORDER



SESE Community Conversation: 1 April 2020

Panelists:

Mini Wadhwa, Director

Ramon Arrowsmith, Deputy Director

Chris Groppi, AD Undergrad Studies

Hilairy Hartnett, AD Grad Studies and Inclusive Community

Patrick Young, AD Community Outreach and Inclusive Community

Teresa Robinette, Director of Research and Operations

Becky Polley, Manager Academic Programs

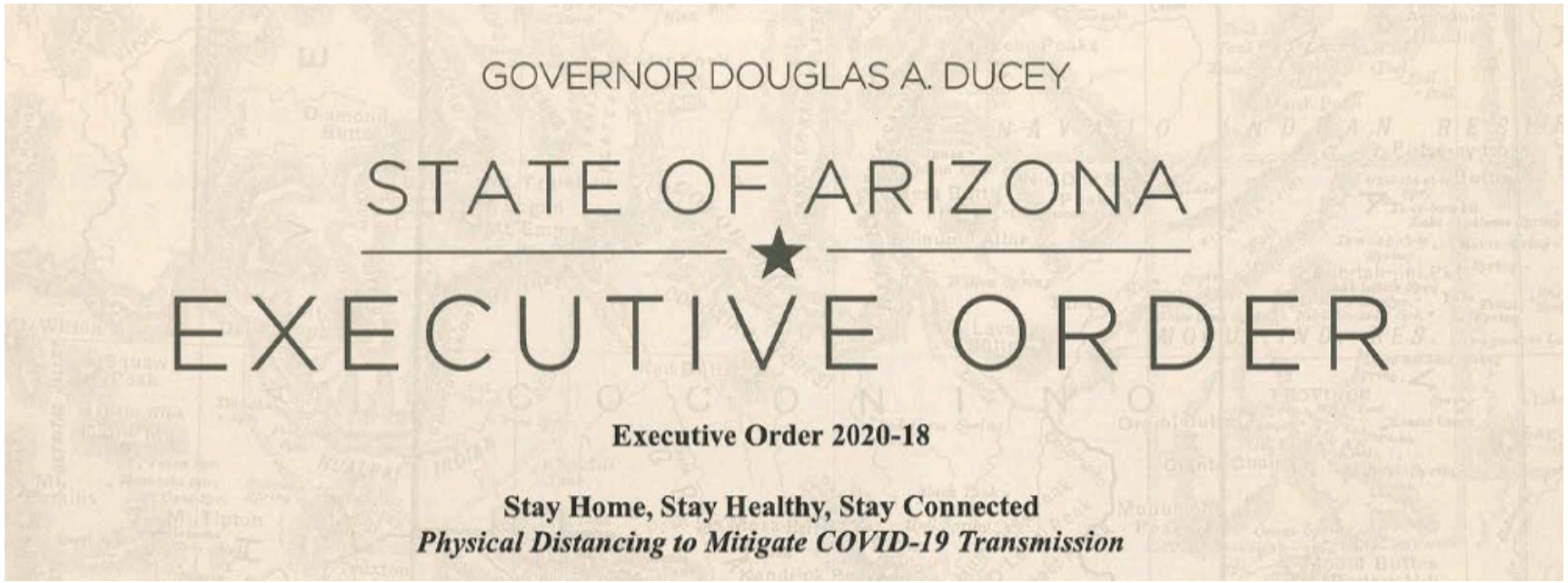
Debbie Garcia, HR Manager

Karin Valentine, Media Relations and Marketing Manager

Marc Biren & Chris Skiba, Facilities & Bldg Safety and Operations

Current Status at ASU/SESE

- Governor Ducey's Stay-at-Home order went into effect yesterday.



1. Arizona shall institute a "Stay home, Stay healthy, Stay connected" policy that promotes physical distancing, while also encouraging social connectedness. This builds on actions the state has already taken, and further memorializes some already in effect, to slow the spread of COVID-19 and protect our citizens.

2. Under this policy, all individuals in the State of Arizona shall limit their time away from their place of residence or property, except:
    a. To conduct or participate in Essential Activities.
    b. For employment, to volunteer or participate in Essential Functions.
    c. To utilize any services or products provided by Essential Businesses.
    d. Employment, if as a sole proprietor or family owned business, work is conducted in a separate office space from your home and the business is not open to serve the public.
    e. No person shall be required to provide documentation or proof of their activities to justify their activities under this order.

4. Under this policy, Essential Activities include:
    a. Obtaining necessary supplies and services for family, household members and pets, such as groceries, food and supplies for household consumption and use, supplies and equipment needed to work from home, assignments for completion of distance learning and products necessary to maintain safety, sanitation and essential maintenance of the home and residence.
    b. Engaging in activities essential for the health and safety of family, household members and pets, including things such as seeking medical, behavioral health or emergency services and obtaining medical supplies or medication.
    c. Caring for a family member, friend, or pet in another household or residence, which includes but is not limited to transportation of a family member, friend or their pet for essential health and safety activities and to obtain necessary supplies and services for the other household.
    d. Engaging in outdoor exercise activities, such as walking, hiking, running, biking or golfing, but only if appropriate physical distancing practices are used.
    e. Attending or conducting work or volunteering in Essential Functions which includes but is not limited to transporting children to child care services for attending work in an essential service.
    f. Engaging in constitutionally protected activities such as speech and religion, and any legal or court process provided that such is conducted in a manner that provides appropriate physical distancing to the extent feasible.

Implications for ASU/SESE

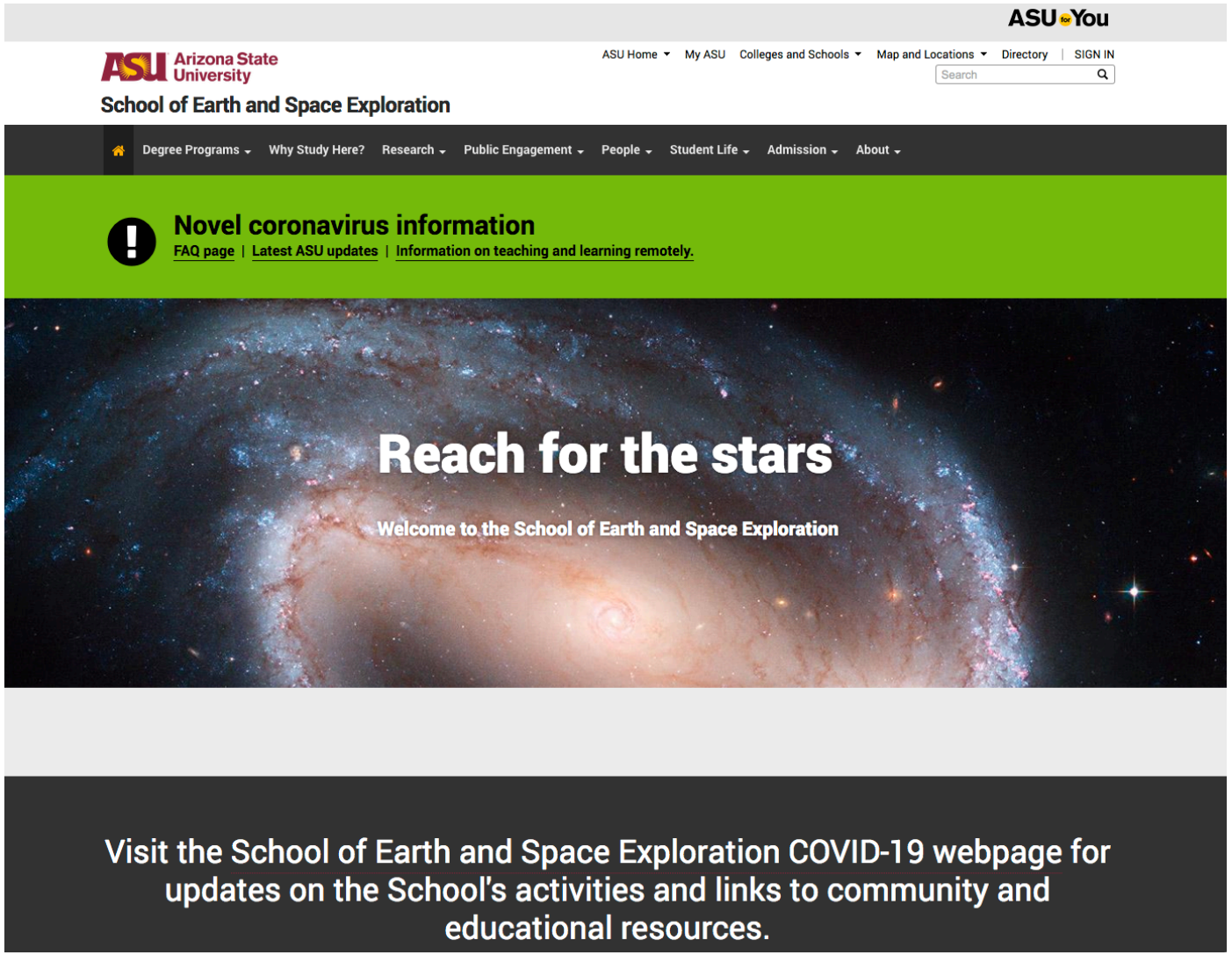
- ASU/SESE operations are largely unaffected relative to the last two weeks
  - We must continue to practice social distancing
  - Remote work is a priority
  - Individuals essential for mission critical activities or for safety of labs/facilities are allowed to be on campus on an as needed basis

News/Communications from ASU Leadership

- We will be continuing remote teaching for summer sessions A and C; no decision yet for session B, but planning for remote operations.
- Housing, Health Services, and food service locations continue to remain open.
- If any space needs cleaning especially if worried about someone exposed to COVID-19, please contact Facilities Management directly at the Facilities Service Desk 24/7 by calling 480-965-3633. Do not contact a service provider directly or do a surface decontamination yourself.
- Laptops and hot spots are available to students. The library is the access point and they will be shipped if the student is out of town. More information is here: https://lib.asu.edu/laptops-and-hotspots

Current Status of SESE

- We are now in our third week of remote operations for all activities in SESE (teaching, advising, student exams/defenses etc.)
- Community activities that are ongoing virtually include:
  - SESE Community Conversations (next one will be April 29, 2020)
  - Open Office Hour with SESE leadership & staff (weekly, 9-10 AM Fridays)
  - SESE Virtual Tea (weekly, 3 PM Thursdays)
  - SESE Engineering Coffee (weekly, 2:30 PM Fridays)
  - SESE Colloquium
    - April 8: SESE students (Zack Torrano, Tyler Richie-Yowell)
    - April 15: Kim Cobb, Georgia Institute of Technology
    - April 22: Peter Girguis, Harvard University


ASU You
Arizona State University
School of Earth and Space Exploration
ASU Home
My ASU
Colleges and Schools
Map and Locations
Directory
SIGN IN
Search
Degree Programs
Why Study Here?
Research
Public Engagement
People
Student Life
Admission
About
Novel coronavirus information
FAQ page | Latest ASU updates | Information on teaching and learning remotely.
Reach for the stars
Welcome to the School of Earth and Space Exploration
Visit the School of Earth and Space Exploration COVID-19 webpage for updates on the School's activities and links to community and educational resources.

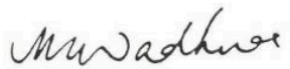
Novel coronavirus information
FAQ page | Latest ASU updates | Information on teaching and learning remotely.

COVID-19 Information and the School of Earth and Space Exploration

A Message from the School Director, Meenakshi Wadhwa

I am deeply grateful for the support and resilience of our community in the School of Earth and Space Exploration as we navigate the difficult circumstances relating to COVID-19. Despite the current challenges, we are making every effort to keep everyone safe, healthy, and connected. As one of these efforts, the School of Earth and Space Exploration has created this special webpage to provide the latest updates from our School, some suggested resources for digital and online learning, and helpful links from the academic and federal sectors on COVID-19. If you have questions or suggestions for additional content, please e-mail us at seseinfo@asu.edu.

Even though we are facing an unprecedented situation, we are still a community and I am confident that we will get through this challenging time together with support from each other!



COVID-19 Virus Updates and Links

View the ASU Novel Coronavirus (COVID-19) official webpage to get the latest information.

If you have questions, the ASU Novel Coronavirus (COVID-19) FAQ's webpage has answers.

View the Coronavirus COVID-19 Global Cases from the Center for Systems Science and Engineering at Johns Hopkins University.

Community Conversation Discussion and Archives

Every two weeks, the SESE Colloquium team will hold a community conversation via Zoom to provide updates on the COVID-19 situation and answer questions from students, staff, faculty and the SESE community. Those webinars are archived here.

SESE Community Conversation Webinar 3/18/2020

Building Updates

SESE infrastructure support will continue remotely. We will continue to provide building updates, ISSAC access and hard keys. If you need assistance we are here to help you. Contact cskiba@asu.edu or marc.biren@asu.edu.

SESE Business Operations Resources

Proposal Funding and Submissions Contact SESERAO@asu.edu. The submissions and questions will be assigned accordingly. In an emergency please contact Alicia.Mangosing@asu.edu or Teresa.Robinette@asu.edu.

For Business Office Purchasing and Travel contact SESEBO@asu.edu.

Important Notes:

- All non-essential travel is on hold.
- For all Purchasing and Reimbursements contact SESEBO@asu.edu and these will be assigned accordingly.
- We have two new positions that are being trained virtually, things will be slower until they are trained. Welcome Rachel Love and Beth Bradley!
- PCards will be supported by Alyssa Hagler and Juana Garcia.
- Kiva Lindaman is out on Maternity Leave for 12 weeks. In an emergency please contact Teresa.Robinette@asu.edu.

Mail Procedures

Currently mail will be delivered once a week on Friday, sorted and distributed in mailboxes accordingly. Rose Petrini will email staff the specifics if there is a package to pick up.

Human Resources

Please continue to send any requests or questions to sesehr@asu.edu. This allows the SESE HR team to access and respond to your inquiry in a timely manner.

Important updates:

- Graduate renewal and faculty summer pay process for Summer 2020 will be rolling out on Monday, March 30. Please watch for forthcoming information.
- Performance evaluation deadline has been extended to April 7. All completed and signed evaluations must be submitted to Debbie Garcia by April 10.
- Per the Provost, all student workers will continue to be paid through May 8, 2020. Please continue to make every effort to keep your student employees working remotely. If you need assistance with finding work for your student workers, please contact sesehr@asu.edu for further information.
- Premium processing for H1B visas has been suspended until further notice. This will impact new hires and any current employees needing to change visa status.
- Please continue to inform SESE HR if you experience an FMLA event or need to request a leave status.
- Any new volunteers or courtesy affiliates that are working remotely will need to contact sesehr@asu.edu to complete the ASU volunteer/courtesy affiliate form.

Health and Wellness Resources

Discover the ASU Mindfulness Center for the body, mind, and soul.

SESE Resources for Digital and Online Learning

Review this helpful guide for running virtual meetings and reviews.

ASU-led NASA Psyche Mission

FREE online courses are available to ANYONE with Internet Access on the ASU Continuing and Professional Education website: The Process and Lifetime of a Space Mission and Tools for Building Positive Team Culture.

The Psyche Mission team has K-12 grade-grouped pages of resources and materials on the Psyche "Models and Materials" page including:

- K-2nd grade
- 3rd-5th grade
- 6th-8th grade
- 9th-12th grade

Everyone can participate in the #PsycheSpaceCRAFTY opportunity and create their own inspired art based on Psyche. Learn how and become spacecrafty!

View the Psyche Mission video gallery and browse the Psyche Mission art gallery.

ASU-led L'SPACE Academy

The NASA L'SPACE Academy is a free, online, interactive program open to undergraduate STEM major students (not just ASU) interested in pursuing a career with NASA or other Space organizations.

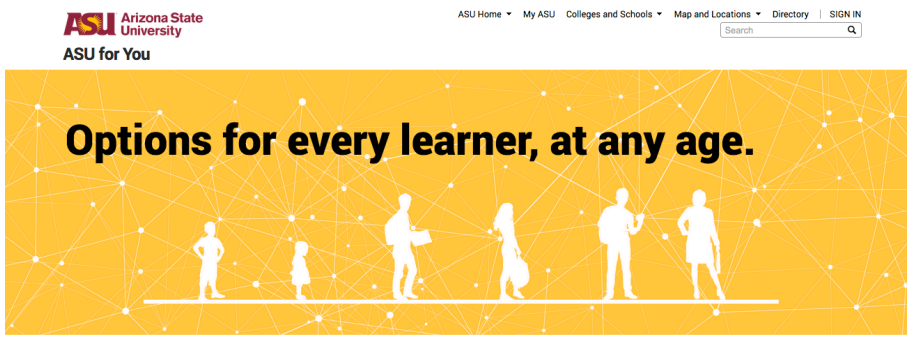
L'SPACE consists of two Academies - the Mission Concept Academy, and the NASA Proposal Writing and Evaluation Experience Academy. Students may participate in one Academy per semester. Each 12-week Academy is designed to provide unique, hands-on learning and insight into the dynamic world of the Space Industry. Students can expect to learn NASA mission procedures and protocols from industry professionals as they collaborate with fellow team members to complete mission-related team-projects.

Requirements for participation include access to a computer with internet and headset capabilities, and time to devote an additional 4-hours per week beyond the online session requirements towards team projects. They are currently accepting summer 2020 applications, with the next academy beginning 5/12/2020.

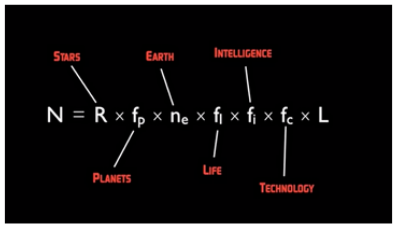
Education Through eXploration (ETX)

ETX designs, develops, deploys, and researches interactive, exploration-based learning experiences through the use of digital platforms, as well as the teaching networks through which content can be created, deployed, adopted, analyzed, and adapted. ETX Provides:

- Online science courses for non-scientists, teaching science as the exploration of the unknown through game-like, adaptive/personalized, project-based education.
- Online Immersive Virtual Field Trips (iVFTs), experiences which enable teaching in the context of place-based exploration.
- Inspark Science Network, a network of digitally-empowered educators in the U.S. (and eventually globally). Educators create and share next-generation courseware and technology – dedicated to enhancing student success in entry-level science.



- Resources for universal learners highlighted in the new **ASU for You** website include those from ETX (Infiniscope, Inspark Teaching Network) and the NASA Psyche Mission Innovation Toolkit



Inspark Teaching Network

Educators, learners of all ages

Textbook replacements, labs, simulations and projects that promote active, personalized learning using exploration-based lessons. Inspark is a global network of educators creating and sharing next-generation courseware.

Explore now

Infiniscope

Teachers, school principals and administrators, home-school families

Infiniscope uses simulations and virtual field trips to help educators engage learners in a whole new way. If you work to deliver education, you can make connections here that help you build adaptive, exciting learning experiences for your students.

Explore now

The NASA Psyche Mission Innovation Toolkit

All learners

Be part of a new generation of explorers as you learn what it takes to make space Missions a reality. Open courses introduce you to skills that took the Psyche mission from conception to launch.

View free courses