The COVID-19 Crisis

Update September 24, 2020
CAVEAT!
I am not THAT kind of doctor.
I study rocks.

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School of Molecular Sciences
Arizona State University
COVID-19 Cases by US States/Territories, normalized by population

Days since 1 case/1m people

Confirmed Cases

Data: Johns Hopkins CSSE, Updated: 03/31/2020

Highlight: Arizona

Scale: Log Scale, Linear Scale

http://91-divoc.com/pages/covid-visualization/
Confirmed COVID-19 Cases by US States/Territories, normalized by population

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

http://91-divoc.com/pages/covid-visualization/
June 17: Local governments can enact masking policies

May 15: Re-opening
June 17: Local governments can enact masking policies

May 15: Re-opening

June 29: Restrictions on gatherings, bars, restaurants, etc.
May 15: Re-opening

June 17: Local governments can enact masking policies

June 29: Restrictions on gatherings, bars, restaurants, etc.
New Confirmed COVID-19 Cases per Day by US States/Territories

Data: John Hopkins University CSSE; Updated: 09/24/2020
Interactive Visualization: https://91-divoc.com by @rchrswd.
http://91-divoc.com/pages/covid-visualization/
On September 16, 2020, Arizona added antigen testing into its main totals figure. This appears to have raised its Total Tests (PCR) number more than usual.

http://91-divoc.com/pages/covid-visualization/
New COVID-19 Tests Performed per Day by US States/Territories

Data: John Hopkins University CSSE; Updated: 09/24/2020
Interactive Visualization: https://91-DIVOC.com/ by @profwada

http://91-divoc.com/pages/covid-visualization/
Effective Reproduction Rate \( R_t \)

\( R_t \) is the average number of people who become infected by an infectious person. If it's above 1.0, COVID-19 will spread quickly. If it's below 1.0, infections will slow. Learn More.
Arizona has about 1,657 ICU beds. Based on best available data, we estimate that 40% (660) are currently occupied by non-COVID patients. Of the 997 ICU beds remaining, 122 are needed by COVID cases, or 12% of available beds. This suggests there is likely enough capacity to absorb a wave of new COVID infections.
July 1:

Arizona is #1 (but not for innovation)

https://globalepidemics.org/key-metrics-for-covid-suppression/
August 5:

Arizona is #8
Sep. 23:

Arizona is #28

https://globalepidemics.org/key-metrics-for-covid-suppression/
MASK UP ARIZONA

MY MASK PROTECTS YOU, AND YOUR MASK PROTECTS ME.
SARS-CoV-2 is Likely Airborne
(as we’ve been saying)


Mounting evidence suggests coronavirus is airborne — but health advice has not caught up

https://www.nature.com/articles/d41586-020-02058-1
A draft version of proposed changes to these recommendations was posted in error to the agency’s official website. CDC is currently updating its recommendations regarding airborne transmission of SARS-CoV-2 (the virus that causes COVID-19). Once this process has been completed, the update language will be posted.

COVID-19 is thought to spread mainly through close contact from person-to-person. Some people without symptoms may be able to spread the virus. We are still learning about how the virus spreads and the severity of illness it causes.

Person-to-person spread

The virus is thought to spread mainly from person-to-person.

- Between people who are in close contact with one another (within about 6 feet),
- Through respiratory droplets produced when an infected person coughs, sneezes, or talks.
- These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.
- COVID-19 may be spread by people who are not showing symptoms.
The dominant route of transmission of SARS-CoV-2 is respiratory.

Direct contact and fomite transmission are presumed but are likely only an unusual mode of transmission.

Growing evidence indicates that infectious virus can be found in aerosols and in exhaled breath samples and it is likely that under certain circumstances, including during aerosol-generating procedures, while singing, or in indoor environments with poor ventilation, the virus may be transmitted at a distance through aerosols.

Nevertheless, there is abundant evidence that proximity is a key determinant of transmission risk... That proximity so clearly increases risk for infection suggests that classic droplet transmission is more important than aerosol transmission.

The accumulated evidence suggests that most transmission is respiratory, with virus suspended either on droplets or, less commonly, on aerosols.
Where are we headed?
Herd immunity is a key concept for epidemic control. It states that only a proportion of a population needs to be immune (through overcoming natural infection or through vaccination) to an infectious agent for it to stop generating large outbreaks. A key question in the current COVID-19 pandemic is how and when herd immunity can be achieved and at what cost.

“Assuming an optimistic herd immunity threshold of 50%, for countries such as France and the USA, this would translate into 100,000–450,000 and 500,000–2,100,000 deaths, respectively…”

In the US we are now at 200,000 deaths

“An effective vaccine presents the safest way to reach herd immunity.”

“For countries in the Northern hemisphere, the coming autumn and winter seasons will be challenging with the likely intensification of viral circulation.”

“At this stage, only non-pharmaceutical interventions, such as social distancing, patient isolation, face masks and hand hygiene, have proven effective in controlling the circulation of the virus and should therefore be strictly enforced.”
Coronavirus Vaccine Tracker

By Jonathan Corum, Sui-Lee Wee and Carl Zimmer  Updated September 23, 2020

<table>
<thead>
<tr>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
<th>LIMITED</th>
<th>APPROVED</th>
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<td>26</td>
<td>14</td>
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Vaccines testing safety and dosage | Vaccines in expanded safety trials | Vaccines in large-scale efficacy tests | Vaccines approved for early or limited use | Vaccines approved for full use

Vaccines typically require years of research and testing before reaching the clinic, but scientists are racing to produce a safe and effective coronavirus vaccine by next year. Researchers are testing 40 vaccines in clinical trials on humans, and at least 92 preclinical vaccines are under active investigation in animals.

Arizona’s Winter Weapon: Ventilation!

![Graph showing temperature changes in Tempe, AZ]

- **High Temp. (°F)**
  - January: 39°F
  - February: 42°F
  - March: 46°F
  - April: 52°F
  - May: 60°F
  - June: 68°F
  - July: 75°F
  - August: 75°F
  - September: 68°F
  - October: 56°F
  - November: 45°F
  - December: 38°F

- **Low Temp. (°F)**
  - January: 39°F
  - February: 42°F
  - March: 46°F
  - April: 52°F
  - May: 60°F
  - June: 68°F
  - July: 75°F
  - August: 75°F
  - September: 68°F
  - October: 56°F
  - November: 45°F
  - December: 38°F

These temperatures highlight the importance of ventilation in Arizona's winter season.
If true, some possible implications:

• May explain diverse disease outcomes
• Good news for vaccine development
• Closer to “herd immunity”?

T cell reactivity against SARS-CoV-2 was observed in unexposed people; however, the source and clinical relevance of the reactivity remains unknown. It is speculated that this reflects T cell memory to circulating 'common cold' coronaviruses. It will be important to define specificities of these T cells and assess their association with COVID-19 disease severity and vaccine responses.

https://www.nature.com/articles/s41577-020-0389-z
Optimist: Half full

Pessimist: Half empty

Realist: Full of water

Physicist: Gas, liquid

Surrealist: Half empty, half full

Relativist: Half empty, half full

Utopist: Full of liquid

Scepticist: It's not water

Nihilist: No water

https://triz-journal.com/glass-half-full-and-half-empty/
New Confirmed COVID-19 Cases per Day by US States/Territories, normalized by population

Data: John Hopkins University CSSE; Updated: 08/05/2020
Interactive Visualization: https://91-DIVOC.com by @profvade
President’s 25-point plan

• On September 2, President Crow outlined 25 actions that “will be undertaken with the goal of enhancing diversity, growth and opportunity for Black undergraduate and graduate students, faculty and staff, while also expanding our academic offerings, community services and collaborative relationships to the benefit of all underrepresented groups and individuals at ASU.”

• https://president.asu.edu/statements/asus-commitment-to-black-students-faculty-and-staff
News/Communications: On campus presence

• Up to ~30% occupancy allowed in SESE buildings; if you are on campus:
  • Mandatory COVID-19 safety training.
  • Face coverings are REQUIRED at all times on campus.
• Rapid and easy saliva testing (24-48 hr turnaround time) has been implemented; random testing of the ASU population.
• Daily health check implemented.
• ASU COVID-19 case updates provided at:
  https://eoss.asu.edu/health/announcements/coronavirus/management

As of September 21: Cumulative number of positive tests since August 1, 2020
• Students: 1,670
• Faculty and staff: 31
News/Communications: Research and Other Ops

• Re-opening protocols implemented for a significant fraction of SESE research operations.

• HQ staff and SESE Leadership are back on campus on a staggered schedule.
  • Staff representing BO-HR-RA-AP will be in office Tuesdays-Thursdays from 8 AM to 2 PM
  • Reception and mail service on Mondays and Fridays.
  • Access is key card only in certain parts of SESE buildings.

• SESE HQ in ISTB4 is staffed as above, SESE HQ in PSF is not staffed. Both are accessible via key card/key access.
News/Communications: Teaching

• Most classes are being taught in ASU Sync mode (synchronous teaching via Zoom, allowing students to join remotely or in-person for limited numbers).

• In practical terms, a small subset of our courses have an in-person component this semester.

• Looking ahead, planning for Spring 2021 is underway; similar to this Fall, most of our courses will be taught in Sync mode.
News/Communications: Budget & Finances

• We are past the 21st day of the Fall semester, so financial picture for the university is somewhat clearer.

• Overall total enrollment for Fall 2020 at ASU is up.
  • Overall enrollment in SESE courses (6526, as of the 21st day of the semester) is down by ~4% relative to this time last year.
  • We successfully launched our fully online BS degree in Astronomical and Planetary Sciences. 95 students signed up – represents ~20% increase in our undergrad majors!

• No furloughs or salary cuts are anticipated at the current time, but also no merit increases.

• We implemented a significant and permanent cut (~$300K) to our total annual budget.
News/Communications: Fall Activities

Fall 2020 activities **open to ALL in the SESE Community:**

- SESE Community Conversations (Noon-1 PM on Oct 29 & Nov 19)
- SESE Colloquium (Wednesdays, 3:30-4:30 PM, weekly)
- Virtual Tea (Thursdays, 3:00-4:00 PM, weekly)
- Engineering Coffee (Fridays, 2:30-3:30 PM, weekly)
- Open listening sessions with SESE leadership (weekly, 9-10 AM Tuesdays)
- One-on-one office hours with the director (weekly, 3-5 PM Thursdays) – sign up for 30 min slots on weekly basis
- Open office hours with AD Inclusive Community (3-4 PM Thursdays)
Light at the end of the COVID-19 tunnel?
Or a plasma source in a mass spec?
JUSTICE-EQUITY-DIVERSITY-INCLUSION IN SESE

COMMUNITY CONVERSATION

SEPTEMBER 24, 2020
It was like death by a thousand paper cuts.
ADDRESSING THESE ISSUES IS A SESE PRIORITY

• Equity is a core value of SESE, integral to every process and structure
• We want to incentivize & encourage work by everyone in the SESE community
• We collect data & center evidence-based approaches
• We create spaces to discuss hard issues
SESE PROGRESS TO DATE

Summer 2018: Established AD for Inclusive Community E. Vivoni & P. Young
Winter 2019: H. Hartnett replaces E. Vivoni
Summer 2019: 1st SESE Inclusive Community Annual Report
Summer 2020: C. Till appointed AD for Inclusive Community

Representative activities & achievements to date:

- Graduate Student & Faculty Climate Survey conducted
- One DEI-related speaker per semester in SESE Colloquium
- DEI now listed as desired qualification in job ads & evaluation category for hiring
- GRE removed from SESE graduate admissions criteria
- Sundial Retention Study
- Summer 2020: Reading Groups & Listening Sessions established, Inclusive Community budget for FY21
SESE JEDI PLAN OF ACTION FOR AY20-21

1. Establishing SESE JEDI Task Force
   a) Host a site survey & develop a 3-5 year plan to improve equity in SESE
   b) Oversee SESE Seed Grants Program for Supporting grassroots activities & initiatives

2. Develop Code of Conduct

3. ADVANCEGeo Workplace Climate Training Spring 2021

4. Community Conversations, Listening Sessions & related JEDI Reading Groups

5. Work with other units and efforts to leverage impact (including College Task Force)
Meet the Task Force

| Chrissy Till, Associate Professor and Associate Director for an Inclusive Community |
| Elizabeth Trembath-Reichert, Assistant Professor |
| Phil Christensen, Full Professor |
| Enrique Vivoni, Full Professor and Associate Dean for Graduate Programs |
| Desiree Crowl, SpaceGrant Coordinator |
| Kimberly Baptista, Alumni & Special Events Coordinator |
| Aaron Boyd, LROC research staff |
| Sean Peters, Postdoctoral fellow |
| Christine O’Donnell, Postdoctoral fellow |
| Ed Buei II, Graduate Student |
| Alexa Drew, Graduate Student |
| Miles Enolish, Undergraduate Student |
| Eric Gutierrez, Undergraduate Student |

- Meets weekly for 1 year
- Highest priority activity is developing a 3-5 year plan to improve equity within SESE structures & communities
- Oversee SESE JEDI Small Grants Program

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<tr>
<th>Ex-Officio Members of the Task Force</th>
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<tr>
<td>Hilary Hartnett, (ex-officio) Full Professor and College JEDI Task Force chair</td>
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<td>Patrick Young (ex-officio), Associate Professor AD Outreach &amp; ASU ADVANCE Fellow</td>
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OPPORTUNITIES FOR SUPPORT NOW

- SESE Student Emergency Assistance Fund: Email patrick.young.1@asu.edu for application.

- SESE Inclusive Community Office Hours: Thursdays 3-4 PM
  https://asu.zoom.us/j/3457383462

- Listening Sessions with SESE Leadership: Tuesdays 9-10 AM

- Support Circles (Int’l, LGBTQIA+, Native, Black/African, Spiritual and more)
  https://eoss.asu.edu/counseling

- SESE Groups: Graduate Student Council (Mansi Padave), Women in Science (Lena Heffern), International Students (Maitrayee Bose & Mansi Padave)

- SESE Inclusive Community Webpage Coming Soon!

- Inclusion.asu.edu – events, resources, reporting information etc.,

- Email me about anything: cbtill@asu.edu
WHAT CAN YOU DO RIGHT NOW?

• Attend the SESE JEDI-related colloquium held 1x semester (Nov. 4, Dr. Lisa White)

• Join SESE Graduate Student, Faculty or LROC JEDI Reading Groups. For more information contact: cbtill@asu.edu

• Attend RISE Up Event Series: https://sites.google.com/asu.edu/rise-up-events/home/rise-up-events?authuser=0 and Native Voices in STEM series.

• Engage with SESE “Equity in the Geosciences” Graduate seminar: Fridays 9-12

• Organize an effort & apply to SESE JEDI Small Grants Program: Call in late Oct/early Nov.

• Check out Academics for Black Survival & Wellness resources and/or sign up for their webinars.

• Consider how you can address systemic bias in all parts of your work and interactions everyday.

• Your suggestions here!

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A call to action: RISE up for racial justice in SOLS

An initiative out of Arizona State University’s Research for Inclusive STEM Education (RISE) Center focused on enhancing awareness, understanding, and commitment to change higher education to be more inclusive and drive for racial justice in STEM education. Please join our workshops, discussions and seminars to help make the Geosciences more inclusive. The initiative is co-sponsored by the ASU/NSF Partners Capacity Project, ASU/A School of Life Sciences Undergraduate Programs and Teaching Innovation Center.
TWO POLLS