# How to keep track
# of all those papers you read

Dr. Casey Middleton

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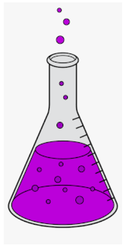
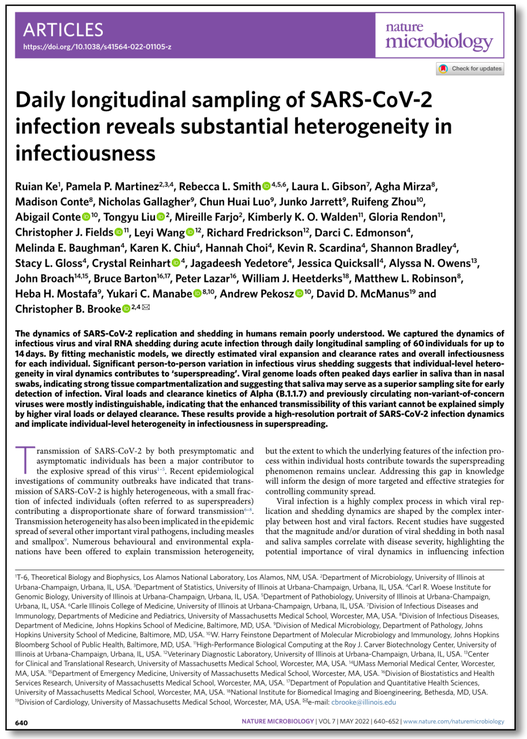
**Scientific Process**



tens-to-hundreds of studies

months-to-years of work



ARTICLES
https://doi.org/10.1038/s41564-022-01105-z

nature microbiology

Check for updates

## Daily longitudinal sampling of SARS-CoV-2 infection reveals substantial heterogeneity in infectiousness

Ruian Ke[1], Pamela P. Martinez[2,3,4], Rebecca L. Smith[4,5,6], Laura L. Gibson[7], Agha Mirza[8], Madison Conte[8], Nicholas Gallagher[9], Chun Huai Luo[9], Junko Jarrett[9], Ruifeng Zhou[10], Abigail Conte[10], Tongyu Liu[2], Mireille Farjo[2], Kimberly K. O. Walden[11], Gloria Rendon[11], Christopher J. Fields[11], Leyi Wang[12], Richard Fredrickson[12], Darci C. Edmonson[4], Melinda E. Baughman[4], Karen K. Chiu[4], Hannah Choi[4], Kevin R. Scardina[4], Shannon Bradley[4], Stacy L. Gloss[4], Crystal Reinhart[4], Jagadeesh Yedetore[4], Jessica Quicksall[4], Alyssa N. Owens[13], John Broach[14,15], Bruce Barton[16,17], Peter Lazar[16], William J. Heetderks[18], Matthew L. Robinson[9], Heba H. Mostafa[9], Yukari C. Manabe[8,10], Andrew Pekosz[10], David D. McManus[19] and Christopher B. Brooke[2,4]✉

**The dynamics of SARS-CoV-2 replication and shedding in humans remain poorly understood. We captured the dynamics of infectious virus and viral RNA shedding during acute infection through daily longitudinal sampling of 60 individuals for up to 14 days. By fitting mechanistic models, we directly estimated viral expansion and clearance rates and overall infectiousness for each individual. Significant person-to-person variation in infectious virus shedding suggests that individual-level heterogeneity in viral dynamics contributes to 'superspreading'. Viral genome loads often peaked days earlier in saliva than in nasal swabs, indicating strong tissue compartmentalization and suggesting that saliva may serve as a superior sampling site for early detection of infection. Viral loads and clearance kinetics of Alpha (B.1.1.7) and previously circulating non-variant-of-concern viruses were mostly indistinguishable, indicating that the enhanced transmissibility of this variant cannot be explained simply by higher viral loads or delayed clearance. These results provide a high-resolution portrait of SARS-CoV-2 infection dynamics and implicate individual-level heterogeneity in infectiousness in superspreading.**

Transmission of SARS-CoV-2 by both presymptomatic and asymptomatic individuals has been a major contributor to the explosive spread of this virus[1–3]. Recent epidemiological investigations of community outbreaks have indicated that transmission of SARS-CoV-2 is highly heterogeneous, with a small fraction of infected individuals (often referred to as superspreaders) contributing a disproportionate share of forward transmission[3–5]. Transmission heterogeneity has also been implicated in the epidemic spread of several other important viral pathogens, including measles and smallpox[6]. Numerous behavioural and environmental explanations have been offered to explain transmission heterogeneity, but the extent to which the underlying features of the infection process within individual hosts contribute towards the superspreading phenomenon remains unclear. Addressing this gap in knowledge will inform the design of more targeted and effective strategies for controlling community spread.

Viral infection is a highly complex process in which viral replication and shedding dynamics are shaped by the complex interplay between host and viral factors. Recent studies have suggested that the magnitude and/or duration of viral shedding in both nasal and saliva samples correlate with disease severity, highlighting the potential importance of viral dynamics in influencing infection

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## Goals of note taking

1. Recover **where** I read something
2. Remember **what** exactly it sad

# Literature Tracking Habits

using citation management software

creating a literature database

taking good notes

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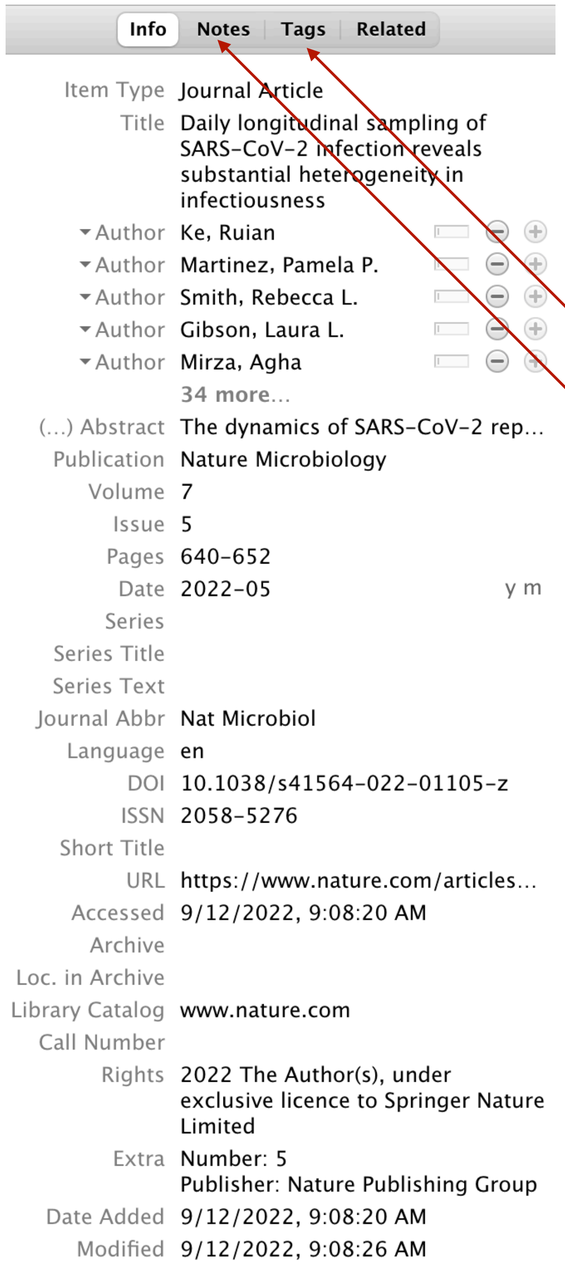
# Citation Management Software




Zotero Mendeley EndNote™

Save papers to database with **key information autofilled**

Organization (tags, folders)

Notes

**Other features:**

- Querying
- Auto-compile bibliography*
- Collaboration - group libraries
- Browser & Google doc extension*

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* note that you should double check citations!!

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# Relational Database

OBSIDIAN

Notion

| Name | Title | Summary |
|---|---|---|
| Howerton2023Evaluation | **Evaluation of the US COVID-19 Scenario Modeling Hub for informing pandemic response under uncertainty** | First identify scenarios that actually occurred, then evaluate models using WIS and coverage |
| Massery2022Influence | **The influence of biological, epidemiological, and treatment factors on the establishment and spread of drug-resistant *Plasmodium falciparum*** | Used LHS and emulator to perform sensitivity analysis of IBM |
| Keeling2021Comparison | **Comparison of the 2021 COVID-19 roadmap projections against public health data in England** | More qualitative analysis of scenario projections using coverage estimates, with a focus on how they under-estimated |

**Where** did I read that?

## Scenario modeling hub

4-9 teams provide 12-52 weeks of probabilistic projections for weekly cases, hospitalizations, and deaths for a given scenario

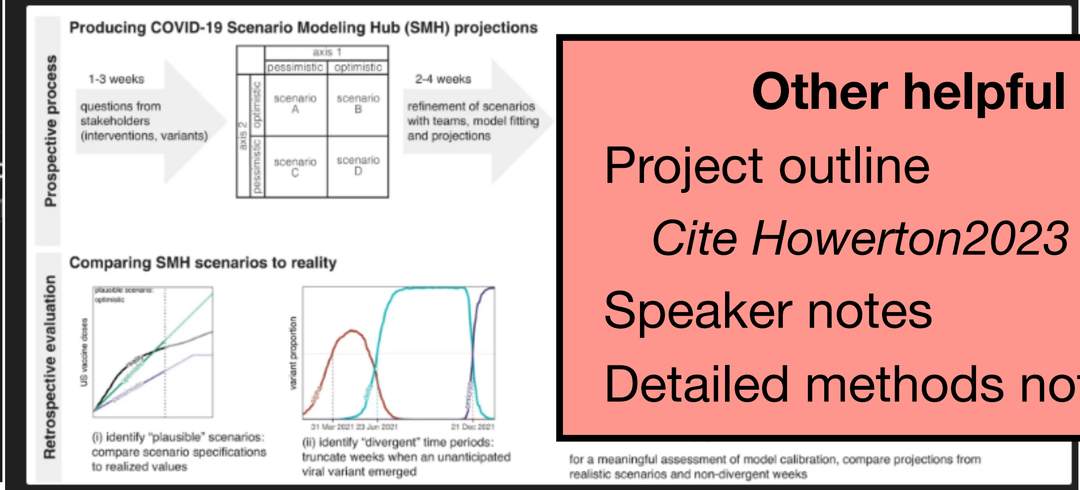
Aggregation method: linear opinion pool

2x2 grid of scenarios with optimistic and pessimistic assumptions about two sources of uncertainty (e.g. variant transmissibility) or intervention (e.g. authorization of childhood vaccines or not)

## Validation

How well projections matched reality depends on:

- How well the scenario definitions matched reality
- Calibration of projections conditional on scenario




Q1: Did scenarios bracket final observation? (e.g. if scenarios were 70% and 80% vax rates, true vax rate was somewhere b

19/28 axes of uncertain

**What** did it say?

### Other helpful page links

Project outline

*Cite Howerton2023* for scenario hub

Speaker notes

Detailed methods notes

| | A | B | C | D | E | F | G | H | I | J | K | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | My Summary | | Sub-areas | |
| 2 | | | | | | | | | | | | Population | |
| 3 | Paper ID | Title | Year | Authors | Sample Size | Fields | Abstract | Purpose/Objective | Main Findings | Data | Response to Previ Limitations | Faculty | PostDoc |
| 4 | 1 | Explaining Gender Differences in Academics' Career Trajectories | 2020 | Aniko Hannak & Kenneth Joseph & Andrei Cimpian | 1800 | 30 academic fields | Academic fields exhibit substantial levels of gender segregation. To date, most attempts to explain this persis- tent global phenomenon have relied on limited | investigate which characteristics of a field predict gender differences among the | Women switch fields based on high expectations of brilliance and they | RCID author profiles (78k transitions, 61k people); urvey over 30 fields (1800 people) | 30 fields across ST social sciences, and humanities; 200 diff countries; 6 decades | x | x |
| 5 | 2 | Keeping Women in the Science Pipeline | 2011 | Mary Ann Mason & Marc Goulden & Karie Frasch | | | Premier science largely depends on the quality of the pool of future scientists. Women now represent a large part of the talent pool in the United States, but many data sources indicate that | addresses the effect of family formation on both when and why women and men | Women drop out of the pipeline for marriage and childbirth; need better family policy; UC | 4 surveys (Survey of Doctorate Recipients (NSF); UC 4 populations (grad students through | Includes reasons v women leave; | x | x |
| 6 | 3 | Women in academic science: A changing landscape | 2014 | Stephen J. Ceci, Donna K. Ginther, | | | Much has been written in the past two decades about women in academic science careers, but this literature is contradictory. Many analyses have | investigate the reasons for the leaky pipeline today, and | current barriers to women's full participation in | SDR, many other surveys | Includes reasons v women leave; disaggregated fiel | x | x |
| 7 | 4 | Falling off the academic bandwagon | 2007 | Elisabeth D. Martinez Jeannine Botos Kathleen M | 1300 | postdocs at NIH | Women are more likely to quit at the postdoc to principal investigator transition | | Women are more likely to quit at the postdoc to principal investigator transition | primary data collection | have not addressed important question: why are fe postdoctoral fellows | x | x |
| 8 | 5 | Women's careers in academic social science: Progress, pitfalls, and plateaus | 2014 | Donna K. Ginther & Shulamit Kahn | | | Many studies have shown that women are under-represented in tenured ranks in the sciences. Here, we evaluate whether gender differences in the likelihood of obtaining a tenure track job, | control for background and productivity characteristics to | The differences that persist for social science as a whole that are not explained | SDR | few studies hav examined acadeı careers for women i social sciences | x | |
| 9 | 6 | Leaks in the pipeline: Separating demographic inertia from ongoing gender differences in academia | 2012 | Allison K. Shaw and Daniel E. Stanton | | | Identification of the causes underlying the under-representation of women and minorities in academia is a source of ongoing concern and controversy. This is a critical issue in ensuring the openness and diversity of academia; yet differences in personal experiences and | We construct a simple model of the academic career that can be used to identify general trends, and separate the | two key non-structural bottlenecks restricting female participation in academia: choice of undergraduate major and application to | NSF | 28-year period (1979–2006); of fields | x | x |
| 10 | 7 | The gender gap in early career transitions in the life sciences | 2018 | Marc J.Lerchenmuell er & Olav Sorenson | | | We examined the extent to which and why early career transitions have led to women being underrepresented among faculty in the life sciences. We followed the careers of 6,336 scientists from the post-doctoral fellowship stage to becoming a principal investigator (PI) – a critical | why early career transitions have led to women being underrepresented among faculty in the life sciences | Women become PIs at a 20% lower rate than men. Differences in "productivity" (publication records) can explain about 60% | ,336 scientist (connects individuals' National Institutes of Health unding histories to their publication record) | Most prior studie have not been capab disentangling cause effect; also, most o prior studies on gender differences | x | x |
| 11 | 8 | Beyond gender schemas: improving the advancement of women in academia | 2005 | VIRGINIA VALIAN | | | | social-cognitive explanation: relies on two key concepts: gender schemas and the accumulation of advantage | to improve gender equity, we need more institutional accountability and better search procedures for hiring | None | None | x | |
| 12 | 9 | Science faculty's subtle gender biases favor male students | 2012 | C. A. Moss-Racusin, J. F. Dovidio, V. L. Brescoll, M. | 127 | | Despite efforts to recruit and retain more women, a stark gender disparity persists within academic science. Abundant research has | whether science faculty exhibit a bias against female students that could | science faculty from research-intensive universities rated the application | primary data collection | this kind of study di exist | x | |
| 13 | 10 | The changing career trajectories of new parents in STEM. | 2019 | Erin A. Cech and Mary Blair-Loy | | | The gender imbalance in science, technology, engineering, and math (STEM) fields has remained constant for decades and increases the farther up the STEM career pipeline one looks. Why does the underrepresentation of women endure? This study | we investigated how new parents fare in STEM, and whether parenthood contributes to the | 4–7 y after the birth or adoption of their first child, 23% of new fathers and 43% of new mothers had left | 003–2010 survey waves of the nationally representative restricted-use SESTAT (Scientists and | a longitudinal study science PhD recipie found that new mot were far less likely t similarly qualified r | | |
| 14 | 11 | Understanding current causes of women's underrepresentation in science | 2011 | Stephen J. Ceci and Wendy M. Williams | | | Explanations for women's underrepresentation in math-intensive fields of science often focus on sex discrimination in grant and manuscript reviewing, interviewing, and hiring. Claims that women scientists suffer discrimination in these arenas rest on a set of studies undergirding policies and programs aimed at remediation. More recent and | Addressing today's causes of underrepresentation requires focusing on education and policy changes that will make | We conclude that differential gendered outcomes in the real world result from differences in resources attributable to | eview of the past 20 y of data (meta-analysis) | | x | |
| 15 | 12 | National hiring experiments reveal 2:1 faculty preference for women on STEM tenure track | 2015 | Wendy M. Williams and Stephen J. Ceci | | | National randomized experiments and validation studies were conducted on 873 tenure-track faculty (439 male, 434 female) from biology, engineering, economics, and psychology at 371 universities/colleges from 50 US states and the | | 2:1 preference for women by faculty of both genders across both math-intensive and | pri | | | |

**What** did it say?

**Where** did I read that?

**What** did it say?

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# Taking Good Notes

What information do I need so I won't have to read this paper again six months from now?

**Two types of questions:**

- **Where** did I read that?
- **What** did it say?

**Strategies:**

- Write a brief paper summary
- What questions will my advisor ask me in 2 months?
- Track paper status
  - "to read", "abstract", "skimmed", "complete"
- Link / DOI / bibTeX
- Keep track of which figure you got data from!

# How to keep track
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**My workflow:**


Autofill info, source BibTeX
Plugins: Chrome, Notero


Database for big ideas
Page for important details

**Highly Recommend**

Use citation management software

Maintain a literature database

Write a brief paper summary relevant to you

There is **not a silver bullet** piece of software to make literature organization seamless.
Different people have different needs. **So just get started.**

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