



COVID-19 Summary

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MIT ILP UPDATES // COVID-19 RELATED

This is a very brief collection of current resources and information from MIT’s Industrial Liaison Program covering a range of issues related to COVID-19 and is offered to help us all navigate during this unprecedented and disruptive time.

MIT ILP UPDATES // COVID-19 RELATED.....	1
UPCOMING EVENTS	2
MIT ILP WEBINARS.....	2
5 OCTOBER, 10:00 AM: DECARBONIZING THE POWER INDUTRY.....	2
13 OCTOBER, 9:30 AM: FLEXIBLE MANUFACTURING.....	2
2-4 OCTOBER: MIT HACKING MEDICINE: GRANDHACK, VIRTUAL	2
PROJECTS, INITIATIVES, RESEARCH	2
MODELING / AIRBORNE TRANSMISSION: COVID-19 INDOOR SAFETY GUIDELINE.....	2
EDUCATION: COVID-19 GUIDANCE FOR EDUCATORS.....	2
<i>What’s Lost, What’s Left, What’s Next: Lessons Learned from the Lived Experiences of Teachers during the 2020 Novel Coronavirus Pandemic.....</i>	3
<i>Education: Will this be a lost year for America’s children?.....</i>	3
POLICY / EDUCATION, HEALTH CARE, SOCIETY: COVID-19 RECOVERY AND RESILIENCE INITIATIVE	4
<i>Project: Understanding the Importance of Summer Learning in a Pandemic</i>	5
PAPERS, ARTICLES, PRESENTATIONS, TALKS	5
MATERIALS SYSTEMS: REACTIVE FIBROUS MATERIALS FOR DECONTAMINATION OF CHEMICAL AND BIOLOGICAL THREATS.....	5
<i>Related paper: Self-Decontaminating Fibrous Materials Reactive toward Chemical Threats</i>	6
PUBLIC HEALTH / CONTACT TRACING: AMERICANS DON’T TRUST CONTACT TRACING APPS. HERE’S HOW WE CAN FIX THAT	7
ECONOMICS / WORK: COVID-19 IS DIVIDING THE AMERICAN WORKER	8
<i>The Nature of Work after the COVID Crisis: Too Few Low-Wage Jobs</i>	8
MACHINE LEARNING / SUPPLY CHAINS: COVID-19 SEPARATES LEADERS FROM LAGGARDS IN ML-DRIVEN DEMAND FORECASTING	8
MIT-RELATED STARTUPS	9
CLOSEDLOOP.AI	9
EQUILERT.....	9
MAKERHEALTH	9

UPCOMING EVENTS

MIT ILP WEBINARS

See: https://ilp.mit.edu/search/event?f%5B0%5D=event_type_term%3A24

5 OCTOBER, 10:00 AM: DECARBONIZING THE POWER INDUSTRY

MIT Corporate Relations / ILP and MITeI

Agenda: <https://ilp.mit.edu/attend/decarbonizing-power-industry>

13 OCTOBER, 9:30 AM: FLEXIBLE MANUFACTURING

MIT Corporate Relations / ILP

Agenda: <https://ilp.mit.edu/attend/flexible-manufacturing>

2-4 OCTOBER: MIT HACKING MEDICINE: GRANDHACK, VIRTUAL

<https://grandhack.mit.edu/boston/>

Annual flagship event in Boston, opens Friday Oct 2, 6 pm: This is the weekend to brainstorm and build innovative solutions with hundreds of like-minded engineers, clinicians, designers, developers and business people.

TRACKS: Access to Healthcare During COVID-19; Customized Cancer Care; Future of Aging; Digital Clinical Measures of Activity.

PROJECTS, INITIATIVES, RESEARCH

EDUCATION: COVID-19 GUIDANCE FOR EDUCATORS

Teaching Systems Lab <https://tsl.mit.edu/>

Justin Reich, [Assistant Professor of Comparative Media Studies/Writing](#) & [director of the MIT Teaching Systems Lab](#)

Author: *Failure to Disrupt: Why Technology Alone Can't Transform Education*, Harvard University Press, September 2020, <https://www.hup.harvard.edu/catalog.php?isbn=9780674089044>

At the Teaching Systems Lab, we have three projects focused on helping educators respond to extended school closures and remote learning.

What's Lost, What's Left, What's Next: To more deeply understand the practice and professional experiences of educators during the 2020 extended school closures, we interviewed 40 teachers from across the country in public, charter, and private schools, at different grade levels, and in different subject areas.

Imagining September. Reopening schools should be a community process with broad input from students and other stakeholders. Over May and June, we met with three groups of education stakeholders (parents, teachers, school and district leaders) and one student group to prototype online approaches to convening multi-stakeholder design meetings. We've published two reports, [one for school leaders with guides and resources for facilitating online design charrettes](#), and [one for educators and the public broadly, with principles and design elements for opening schools in the fall](#).

Remote Learning Guidance from State Education Agencies during COVID-19: In the report "[Remote Learning Guidance from State Education Agencies During the COVID-19 Pandemic: A First Look](#)", we provide recommendations and best practices for state education agencies providing remote learning guidance during COVID-19 school closures.

What's Lost, What's Left, What's Next: Lessons Learned from the Lived Experiences of Teachers during the 2020 Novel Coronavirus Pandemic

Justin Reich, Christopher Buttimer, Dan Coleman, Richard Colwell, Farah Faruqi, Laura Larke, EdArXiv Preprints, Submitted: July 22, 2020 | Last edited: July 23, 2020, <https://edarxiv.org/8exp9/> DOI: [10.35542/osf.io/8exp9](https://doi.org/10.35542/osf.io/8exp9)

To more deeply understand the practice and professional experiences of educators during the 2020 extended school closures, we interviewed 40 teachers from across the country in public, charter, and private schools, at different grade levels, and in different subject areas. From our conversations, three key themes emerged: 1) Student Motivation: Teachers struggled to motivate their students through two layers of computer screens; 2) Professional Loss and Burnout: As they lost familiar means of teaching, teachers also lost a fundamental sense of their own efficacy and professional identity; and, 3) Exacerbated Inequities: This sense of loss grew deeper as teachers witnessed the dramatic intensification of the societal inequalities that had always shaped their students' lives. Effective planning for school reopening in Fall 2020 will require understanding and addressing these challenges facets of teachers' experience. We propose five design considerations to plan for resilience: center equity, focus on relationship-building, address student motivation, address staff motivation and burnout, and mitigate uncertainty. Full, de-identified transcripts of most teacher interviews are available at <https://osf.io/2fjtc/>. Other researchers who have interviewed teachers this spring and summer are encouraged to share their data there as well.

Education: Will this be a lost year for America's children?

Moderated by Emily Bazelon

11 September 2020, New York Times Magazine, <https://www.nytimes.com/interactive/2020/09/11/magazine/covid-school-reopenings.html>

Quote from: Justin Reich, Assistant Professor of Comparative Media Studies/Writing and director of the MIT Teaching Systems Lab

...The debate over what form school should take this fall foundered amid political division and uncertainty. In early August, as teachers raised safety concerns about reopening and education officials struggled with inconclusive and constantly changing public-health guidance, President Trump tweeted "OPEN THE SCHOOLS!!!" It was a blanket statement,

made with no consideration of where or how reopening could be attempted with reasonable risk, based on the local rate of coronavirus cases and testing. The Trump administration also threatened to take federal funding from schools that did not reopen rather than offering more assistance for the preparation and precautions the pandemic demands.

The risk of coronavirus outbreaks has been the primary concern. But shutting school and going remote will also inflict a serious cost, borne by students: a loss of learning and social-emotional development. In Los Angeles, for instance, kindergarten enrollment has plummeted this fall, a drop that school officials attribute to the difficulty families have supporting online learning full time at home, which is what young children need. **“Once schools shuttered in the early days of the pandemic, educators quickly discovered the possibilities and limits of distance-learning technologies,”** notes Justin Reich, director of the MIT Teaching Systems Lab and author of the book **“Failure to Disrupt: Why Technology Alone Can’t Transform Education,”** which will be published this month. **“Months later, it is obvious that the bright points of learning tech are substantially offset by the loss of schools as places for camaraderie, shelter, nutrition, social services, teaching and learning. Many things that happen in schools simply cannot happen at a distance.”** We brought together five experts to talk about the lasting impact of this extended and unprecedented period of upended education. Accompanying this roundtable are photographs of students, school faculty and staff during the opening days of the 2020 school year, capturing the wide variety in learning environments around the country...

POLICY / EDUCATION, HEALTH CARE, SOCIETY: COVID-19 RECOVERY AND RESILIENCE INITIATIVE

Abdul Latif Jameel Poverty Action Lab (J-PAL)

Co-Chairs: [Amy Finkelstein](#) and Lawrence Katz (Harvard)

<https://www.povertyactionlab.org/initiative/covid-19-recovery-and-resilience-initiative>

<https://news.mit.edu/2020/j-pal-north-america-launches-research-initiative-covid-19-recovery-0921>

J-PAL North America’s COVID-19 Recovery and Resilience Initiative aims to help individuals and communities recover in the aftermath of COVID-19 by identifying and implementing effective policy responses to the pandemic.

J-PAL North America’s COVID-19 Recovery and Resilience Initiative aims to create a playbook of evidence-based policies to help communities recover in the wake of COVID-19. The initiative works with nonprofits, government and industry leaders, academic researchers, and other organizations to understand what questions matter most to them and help them use rigorous evaluation to generate evidence on priority research questions related to the COVID-19 response.

The COVID-19 Recovery and Resilience Researcher-facing [RFP solicits proposals](#) from J-PAL affiliates, J-PAL post-docs, and invited researchers for pilot studies and full randomized evaluations that aim to generate valuable insights about the policy response to the COVID-19 pandemic.

Project: Understanding the Importance of Summer Learning in a Pandemic

<https://www.povertyactionlab.org/initiative-project/understanding-importance-summer-learning-pandemic-1>

This study seeks to better understand the role of individualized, virtual summer instruction in redressing learning losses resulting from the COVID-19 school closures. In particular, we are interested in the potential for virtual learning to combat the negative effects of time out of school on achievement gaps. Given the mixed evidence on virtual learning platforms, especially for disadvantaged populations, the prospect of repeated school closures in the upcoming school year points to an urgent need to identify optimal strategies for online education. Our research design is based on a randomized-control trial evaluation of a unique summer program in NYC which will be offered free of charge to public school students in grades 3-8. All study students will have access to the virtual study materials, and treatment group students will additionally receive synchronous virtual instruction and comprehensive supports. By comparing Fall 2020 administrative test scores for the two experimental arms, we will identify the impact of personalized teacher interaction in a virtual setting on student learning. Online assessments from the first week of virtual programming will provide a baseline description of students' skill levels following a shortened school year.

PAPERS, ARTICLES, PRESENTATIONS, TALKS**MATERIALS SYSTEMS: REACTIVE FIBROUS MATERIALS FOR DECONTAMINATION OF CHEMICAL AND BIOLOGICAL THREATS**

[Lev Bromberg](#), Xiao Su (PhD, Hatton group), Vladimir Martis, and [T. Alan Hatton](#)
Request paper from Dr. Lev Bromberg, <https://hattongroup.mit.edu/daj-members/>

Keywords: personal protective equipment, coronavirus type 229E inactivation, nonwoven fabric, reactive decontaminating materials, nucleophilic polyamines, polyallylamine, 4-aminopyridine, 5-(4-hydroxybenzylidene) hydantoin.

Abstract: Polyamines are water-soluble polyelectrolytes with the amino groups that can be used to attach the polymers onto functional surfaces of fibrous materials. In addition, polyamines can be readily modified by (super)nucleophilic groups such as (alkyl) aminopyridines that enhance the polymer's ability to promote hydrolysis of organophosphorous chemical warfare agents. Furthermore, attachment of hydantoin moieties augments the number of the imide, amide, or amine groups on the polyamine's chain, which provides oxidizing properties to the resulting modified polyamine after halogenation. We report on polyamines with side chains modified to contain both (4-aminopyridine, APy) and 5-(4-hydroxybenzylidene)hydantoin (HBH) functionalities with enhanced content of the active bromine. Virucidal activity of the APy- and HBH-modified polyallylamine against human coronavirus (type 229E) was tested both in solution and on nylon- cotton fabric. The polymers appeared to be effective in inactivation of the coronavirus, at both low concentrations and short exposure times.

Summary: Advances in the development of broad-range virucidal and antimicrobial polymers, offer the possibility of customizing a wide range of paints and coatings for engineered surfaces, including on fabrics, protective equipment and medical devices. Our approach toward enhancing decontaminating properties of polyamines by their

modification with supernucleophilic groups has been further augmented by the development of dually-active polymers also containing oxidizing N-halamine groups. The developed polymers are shown to be highly reactive and possess a broad-range biocidal activity, including for human coronavirus inactivation and sporicidal activity.

Related paper: Self-Decontaminating Fibrous Materials Reactive toward Chemical Threats

Lev Bromberg, Xiao Su, Vladimir Martis, Yunfei Zhang, and T. Alan Hatton
ACS Appl. Mater. Interfaces 2016, 8, 27, 17555–17564, <https://doi.org/10.1021/acsa-mi.6b05241>

Polymers that possess highly nucleophilic pyrrolidinopyridine (Pyr) and primary amino (vinylamine, VAm) groups were prepared by free-radical copolymerization of N,N-diallylpyridin-4-amine (DAAP) and N-vinylformamide (NVF) followed by acidic hydrolysis of NVF into VAm. The resulting poly(DAAP-co-VAm-co-NVF) copolymers were water-soluble and reacted with water-dispersible polyurethane possessing a high content of unreacted isocyanate groups. Spray-coating of the nylon–cotton (NYCO), rayon, and poly(p-phenylene terephthalamide) (Kevlar 119) fibers pretreated with phosphoric acid resulted in covalent bonding of the polyurethane with the hydroxyl groups on the fiber surface. A second spray-coating of aqueous solutions of poly(DAAP-co-VAm-co-NVF) on the polyurethane-coated fiber enabled formation of urea linkages between unreacted isocyanate groups of the polyurethane layer and the amino groups of poly(DAAP-co-VAm-co-NVF). Fibers with poly(DAAP-co-VAm-co-NVF) attached were compared with fibers modified by adsorption of water-insoluble poly(butadiene-co-pyrrolidinopyridine) (polyBPP) in terms of the stability against polymer leaching in aqueous washing applications. While the fibers modified by attachment of poly(DAAP-co-VAm-co-NVF) exhibited negligible polymer leaching, over 65% of adsorbed polyBPP detached and leached from the fibers within 7 days. Rayon fibers modified by poly(DAAP-co-VAm-co-NVF) were tested for sorption of dimethyl methylphosphonate (DMMP) in the presence of moisture using dynamic vapor sorption technique. Capability of the fibers modified with poly(DAAP-co-VAm-co-NVF) to facilitate hydrolysis of the sorbed DMMP in the presence of moisture was uncovered. The self-decontaminating property of the modified fibers against chemical threats was tested using a CWA simulant diisopropylfluorophosphate (DFP) in aqueous media at pH 8.7. Fibers modified with poly(DAAP-co-VAm-co-NVF) facilitated hydrolysis of DFP with the half-lives up to an order of magnitude shorter than that of the unmodified fibers. The presented polymers and method of multilayer coating can lead to a development of self-decontaminating textiles and other materials.

PUBLIC HEALTH / CONTACT TRACING: AMERICANS DON'T TRUST CONTACT TRACING APPS. HERE'S HOW WE CAN FIX THAT

By Sarah Kreps, [Nina McMurry](#), and Baobao Zhang
Fortune, 17 August 17 2020 <https://fortune.com/2020/08/17/contact-tracing-privacy-coronavirus-google-apple/>

[Nina McMurry](#) is a political scientist at MIT (PhD 2020; <https://www.ninamcmurry.com/>)
Sarah Kreps and Baobao Zhang are political scientists at Cornell University

With COVID-19 cases climbing across the U.S. and manual contact tracing efforts to stem the spread of the disease faltering, officials are turning to a tech solution that nearly four dozen countries have adopted: digital contact tracing apps.

In the coming weeks, over 20 states and localities in the U.S. plan to roll out COVID-19 contact tracing apps based on a model developed by Google and Apple—one that relies on a phone's Bluetooth signal to exchange digital handshakes with other devices in a six-foot range.

The data collected from the app is stored within a user's phone, rather than on a government server, and only when an app user is diagnosed with COVID-19 are they asked by health authorities to share the data in the app so that others can be alerted to a possible infection. These apps become more effective at preventing the spread of COVID-19 if more people download and use them. Despite some countries' botched rollouts, Ireland has shown that it's possible to get a large percentage of the public to use these apps.

But deploying contact tracing apps is an uphill battle in the U.S.: Americans are still too distrustful of contact tracing apps for them to be effective. That means public health authorities have a lot of work to do to allay the public's fear before they can deploy this technology.

In a study of 2,000 Americans, fielded between June 25 and 26, 2020, we found that 42% supported the adoption of contact tracing apps. Support was lower for digital contact tracing than for five other public health surveillance policies: temperature checks, traditional contact tracing, centralized quarantine, immunity passes for public transit, and electronic device monitoring...

...Finally, public health officials must recognize that many Americans, often those who are the most vulnerable to COVID-19, cannot use contact tracing apps. For instance, only 53% of those who are 65 and above own smartphones. Smartphone ownership is also lower among those with lower levels of education and income, who are also more likely to be working "essential" service jobs. To protect these populations, public health authorities should continue to invest in improving manual contact tracing. In our survey, we find that Black Americans are less supportive of expanding traditional contact tracing compared with white Americans. Considering these survey results, states should recruit and train contact tracers who can effectively communicate to those in minority communities who are overpoliced and may fear overreach by the government.

Fortunately, trust in local and state governments remains high. Upcoming contact tracing rollouts would be wise to emphasize the local and state basis for app implementation. Rolled out along these lines, the U.S. is more likely to find that the answer to its national public health crisis resides in a patchwork of local success stories.

ECONOMICS / WORK: COVID-19 IS DIVIDING THE AMERICAN WORKER

Christopher Mims, Wall Street Journal, 22 August 2020,
<https://www.wsj.com/articles/covid-19-is-dividing-the-american-worker-11598068859>

The rapid adoption of remote work and automation could accelerate inequalities in place for decades. Economists say the resulting ‘K’ shaped recovery will be good for professionals— and bad for everyone else.

The Nature of Work after the COVID Crisis: Too Few Low-Wage Jobs

David Autor and Elisabeth Reynolds, MIT Task Force on the Work of the Future

July 2020, Hamilton Project, https://www.hamiltonproject.org/assets/files/AutorReynolds_LO_FINAL.pdf

Summary: David Autor and Elisabeth Reynolds ask whether the COVID-19 pandemic has changed the conventional wisdom about automation and inequality in the United States over the past four decades. They make four projections about a rapidly-automating post-COVID-19 economy: increasing telework, urban de-densification, large-firm consolidation, and forced automation, all of which have significant, negative consequences for low-wage workers and economic inequality. On a more hopeful note, they conclude that rising inequality is not the only possible path forward, with the immense government investment of the past months suggesting the possibility of large-scale interventions to alleviate the costs of automation.

MACHINE LEARNING / SUPPLY CHAINS: COVID-19 SEPARATES LEADERS FROM LAGGARDS IN ML-DRIVEN DEMAND FORECASTING

by [Maria Jesus Saenz](#) (Director of MIT Digital Supply Chain Transformation) with [Dr. Sergio Caballero](#) (Research Scientist, MIT CTL)

15 Sept 2020, CTL on Medium

<https://medium.com/mitsupplychain/covid-19-separates-leaders-from-laggards-in-ml-driven-demand-forecasting-a5c05b6c3e26>

Machine learning (ML) has revitalized demand forecasting by enabling companies to anticipate customers’ buying patterns with remarkable accuracy. But are ML’s powers compromised by Covid-19’s unprecedented demand patterns?

The answer is yes and no, depending on the type of enterprise and business model involved. Moreover, the difference between companies that continue to gain a competitive advantage from ML-based demand forecasts and those that struggle to harness the technology could become greater in a post-pandemic future....

... The ML leaders’ competitive advantages are likely to become even more pronounced when the Covid-19 crisis subsides because the skills they acquired will make them formidable competitors.

This benefit is particularly striking for those companies driven by a culture of innovation and the need to turn adversity into opportunity. Their guiding light during the pandemic is growth — as opposed to survival. They know that applying the key lessons learned during the crisis to product innovation can open new growth avenues in a post-pandemic future.

MIT-RELATED STARTUPS

MIT Startup Exchange: <https://startupexchange.mit.edu/>

CLOSEDLOOP.AI

Austin, TX, <https://closedloop.ai/>

ClosedLoop is Healthcare's Data Science Platform. We make it easy and affordable for healthcare organizations to use data science to improve quality and reduce costs. Our technology consists of two key pillars - a healthcare specific machine learning automation platform and a catalog of pre-built predictive and prescriptive models that can be customized and extended based on your local population needs.

Covid-19 Response: The C-19 Index is an open source, AI-based predictive model that identifies people who are likely to have a heightened vulnerability to severe complications from COVID-19 (commonly referred to as "The Coronavirus"). The C-19 Index is intended to help hospitals, federal / state / local public health agencies and other healthcare organizations in their work to identify, plan for, respond to, and reduce the impact of COVID-19 in their communities. The C-19 Index does NOT predict who will become infected with COVID-19 or geographic locations where the virus might spread. It is meant to identify people with a heightened risk of severe complications should they become infected.

EQUILERT

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Human and Veterinary health monitoring devices

Covid-19 Response: BioSec™ monitors supply-chains of COVID-19 viral test kits, medications and vaccines using secure IoT, blockchain and AI technology. BioSec™ can monitor test swabs, RT-PCR kits, vaccines and reagents throughout the process of distribution, testing and diagnostic lab as well as vaccination sites and protocols; BioSec™ provides insights into supply-chains which improves health care protocols for reducing false negatives and vaccine spoilage with effective asset delivery to maximize outbreak control.

MAKERHEALTH

Cambridge, MA, <https://makerhealth.co/>
<https://twitter.com/makerhealthco>

At MakerHealth we believe in democratizing the tools of health making around the world. Whether it's a hospital bed, smart pill bottle, or an improved triage mobile phone app we

believe that design should be transparent, hackable, and enabling for everyone to be the designers and makers of their own healthcare solutions.

Covid-19 Response: Frontlines of Health Making #VirtuallyMakerFaire ([May 2020](#) – listen to zoom recording)—Learn how a hospital makerspace team of nurses, doctors and frontline clinicians are responding to the COVID-19 pandemic by making solutions in realtime!

UnityPoint Health - St. Luke's Hospital partnered with MakerHealth to open a hospital makerspace in November 2019. The lab helped to build a culture of experimentation so that 6-months later they were prepared to respond to the COVID-19 pandemic. In the last 2 months, doctors, nurses, and other clinicians from across the hospital have designed and prototyped 20+ solutions to challenges brought on by COVID-19 resulting in nearly 2,000 device units in use across our health system. With the tools of making at the frontlines, they have gone through more than 50 iterations and testing with 150 St. Luke's staff. Nine of these projects went from sketch to bedside in under 4 hours.

Rose Hedges, Clayton Skousen, **Anna Young**, **Jose Gomez-Marquez** and Nik Albarran will be live for a Q&A panel to share how the open-access culture of accepting all ideas helps the entire hospital team make an impact in St. Luke's response to the pandemic.