


# CS 3001-A: Computing, Society, and Professionalism

Munmun De Choudhury | Associate Professor | School of Interactive Computing

Week 12: Algorithmic  
Manipulation  
March 27, 2024



# A Lack of Control



# Impacting Real World Outcomes: The Positive Side

# Defining “fake news”



Professor in Political Science and Computer and Information Science

## DAVID LAZER

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Northeastern University



## BIOGRAPHICAL NOTES IRSE

Welcome! I am Professor at the Department of Political Science and College of Computer and Information Science at Northeastern University. Click here for **biographical information** and an overview of my publications, of teaching and academic activities, and some media appearances.

Yours,

David Lazer



## RESEARCH FOLLOWUP

The objective of this website is to provide entrée into **my body of research**. Most of my work is based on the idea that how people and organizations are connected together is critical to understanding the **functioning, success and failure of actors and systems**. My teaching, research, and institution building have all centered on that theme. I've taken that essential idea and, with a variety of collaborators, examined a **wide array of domains**.



## LABORATORY

My research covers everything from **very micro** (social influence processes within groups), to the **very macro** (the development of global-wide regulatory regimes).

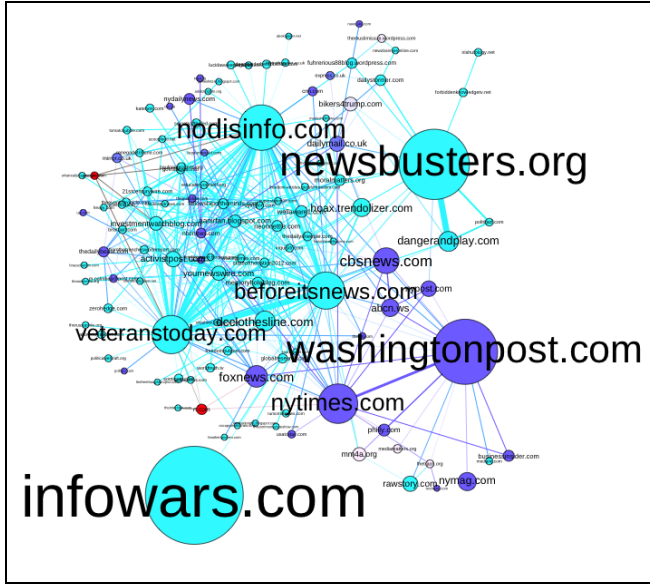


# Sources of misinformation/disinformation

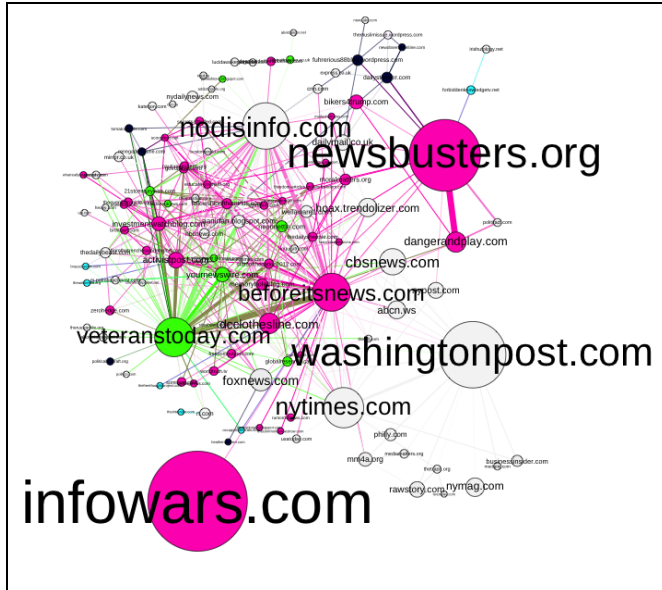
- Rumors and fiction
- Governments and politicians
- Vested interests
- The media

# Examining the Alternative Media Ecosystem Through the Production of Alternative Narratives of Mass Shooting Events on Twitter

Purple = mainstream media; Aqua = alternative media; Red = government controlled media



ink = U.S. Alt-Right; Aqua = U.S. Alt-Left; Green = Intl. Anti-Globalist; Black = White Nationalist/Anti-Semitic; White = other




# Summary (2)

Leaning	Description
U.S. Alt Right	U.S. focused, anti-mainstream media, pro-Christian, anti-LGBT, anti-feminist, anti-globalist, climate change denying
U.S. Alt Left	U.S. focused, anti-mainstream media, anti-corporatist, critical of police, pro-prison reform, pro-BlackLivesMatter
International Anti-Globalist	Internationally focused, anti-globalist or anti-New World Order/Cabal, anti-corporatist, conspiracy-focused
White Nationalist and/or Anti-Semitic	primarily white-nationalist or anti-Semitic positions
Muslim Defense	primarily challenges mainstream narratives of terrorist attacks by Muslims
Russian Propaganda	primarily supports Russian interests, anti-globalist

# The spread of true and false news online





# The societal costs of misinformation

By –  
Laura  
Santhanam

Leave your  
feedback

Share ...



# Measles cases are rising in the U.S. Here's why misinformation about the vaccine persists today

[Health](#) Feb 23, 2024 8:56 AM EDT

Global measles cases are on the rise, in spite of the widespread availability of a life-saving vaccine. It's an ominous reflection of waning vaccine confidence, experts say.

In the United States, multiple children from [Broward County](#) were sick with the disease this month, school officials in Florida confirmed. However, the state's Surgeon General Joseph Ladapo continued to make statements that could appear to diminish, if not discredit, the use of vaccines. In a [Feb. 20 letter to school officials](#), Ladapo wrote that Florida's Department of Health "is deferring to parents or guardians to make decisions about school attendance," citing the "high immunity rate in the community" and "the burden on families and the educational costs of healthy children missing school."

[Français](#)[Русский](#)[Deutsch](#)

# Infodemics and misinformation negatively affect people's health behaviours, new WHO review finds

1 September 2022 | News release | Reading time: 3 min (682 words)

Incorrect interpretations of health information, which increase during outbreaks and disasters, often negatively impact people's mental health and increase vaccine hesitancy, and can delay the provision of health care, a new WHO review shows.

The authors conclude that the effects of infodemics and health misinformation online can be countered by “developing legal policies, creating and promoting awareness campaigns, improving health-related content in mass media and increasing people's digital and health literacy”.

## Related

[Infodemics and health misinformation: a systematic review of reviews \(2022\)](#)



Group for the  
Advancement of  
Psychiatry

Psychiatry's Think Tank

## MEDIA

# How to Counter TikTok's Mental Health Misinformation

The social media phenomenon is driving self-diagnosis.

Posted February 1, 2023 |  Reviewed by Gary Drevitch



### THE BASICS

What Is ADHD?

[Find counselling to overcome ADHD](#)

## KEY POINTS

- During the pandemic, TikTok served as a way for teens to connect with others over sharing a mental health illness.
- Predatory advertising and popularity incentives drove creation of content that promoted self-diagnosis and misinformation.
- Parents and clinicians can assist teens who are identifying with mental illnesses with non-judgmental questions and supportive listening.

By Ashvin Sood, MD, and GAP's Committee on Psychiatry in the Media

Renewed interest

# Media's Next Challenge: Overcoming the Threat of Fake News



**Jim Rutenberg**

MEDIATOR NOV. 6, 2016



Spielberg  
Turbulent

A Failure

In AT&T  
With Tru

Terrorism

Russia In

[See More](#)



# The challenges of bots

# Social bots distort the 2016 U.S. Presidential election online discussion

by Alessandro Bessi and Emilio Ferrara

## Abstract

Social media have been extensively praised for increasing democratic discussion on social issues related to policy and politics. However, what happens when this powerful communication tools are exploited to manipulate online discussion, to change the public perception of political entities, or even to try affecting the outcome of political elections? In this study we investigated how the presence of social media bots, algorithmically driven entities that on the surface appear as legitimate users, affect political discussion around the 2016 U.S. Presidential election. By leveraging state-of-the-art social bot detection algorithms, we uncovered a large fraction of user population that may not be human, accounting for a significant portion of generated content (about one-fifth of the entire conversation). We inferred political partisanship from hashtag adoption, for both humans and bots, and studied spatio-temporal communication, political support dynamics, and influence mechanisms by discovering the level of network embeddedness of the bots. Our findings suggest that the presence of social media bots can indeed negatively affect democratic political discussion rather than improving it, which in turn can potentially alter public opinion and endanger the integrity of the Presidential election.

## Contents

[Introduction](#)  
[Methodology](#)  
[Data analysis](#)  
[Conclusions](#)

## Introduction

Various computational social science studies demonstrated that social media have been extensively used to foster democratic conversation about social and political issues: From the Arab Spring (González-Bailón, *et al.*, 2011; Howard, *et al.*, 2011), to Occupy Wall Street (Conover, *et al.*, 2013a; Conover, *et al.*, 2013b) and many other civil protests (Varol, *et al.*, 2014; González-Bailón, *et al.*, 2013) (Bastos, *et al.*, 2014), Twitter and other social media seemed to play an instrumental role to involve the public in policy and political conversations, by collectively framing the narratives related to particular social issues, and coordinating online and off-line activities. The use of digital media to discuss politics during election times has also been the subject of various studies, covering the last four U.S. Presidential elections (Adamic and Glance, 2005; Diakopoulos and Shamma, 2010; Bekafigo and McBride, 2013; Carlisle and Patton, 2013; DiGrazia, *et al.*, 2013; Wang, *et al.*, 2016), and other countries like Australia (Gibson and McAllister, 2006; Bruns and Burgess, 2011; Burgess and Bruns, 2012), and Norway (Enli and Skogerboe, 2013). Findings that focused on the positive effects of social media such as incrementing voting turnout (Bond, *et al.*, 2012) or exposure to diverse political views (Bakshy, *et al.*, 2015) contributed to the general praise of these platforms as a tool to foster democracy and civil political engagement (Shirky, 2011; Loader and Mercea, 2011; EFTing, *et al.*, 2011; Tufekci and Wilson, 2012; Tufekci, 2014; Yang, *et al.*, 2016).

However, as early as 2006, Philip Howard raised concerns regarding the possibility of manipulating public opinion and spreading political misinformation through social media (Howard, 2006). These issues have been later proved true by several studies (Ratkiewicz, *et al.*, 2011a; Ratkiewicz, *et al.*, 2011b) (Metaxas and Mustafaraj, 2012) (El-Khalili, 2013; Ferrara, 2015; Woolley and Howard, 2016; Shorey and Howard, 2016). Of particular concern is the fact social media have been demonstrated effective in influencing individuals (Aral and Walker, 2010). One way to perform such type of manipulation is by using social bots, algorithmically controlled accounts that emulate the activity of human users but operate at much higher pace (e.g., automatically producing content or engaging in social interactions), while successfully keeping their artificial identity undisclosed (Hwang, *et al.*, 2012; Messias, *et al.*, 2013; Ferrara, *et al.*, 2016).

Evidence of the adoption of social media bots to attempt manipulating political communication dates back half a decade: during the 2010 U.S. midterm elections, social bots were employed to support some candidates and smear others, by injecting thousands of tweets pointing to Web sites with fake news (Ratkiewicz, *et al.*, 2011a). The research community reported another similar case around the time of the 2010 Massachusetts special election (Metaxas and Mustafaraj, 2012). Campaigns of this type are sometimes referred to as *astroturf* or *Twitter bombs*. Unfortunately, most of the times, it has proven impossible to determine who's behind these types of operations (Kollanyi, *et al.*, 2016; Ferrara, *et al.*, 2016). Governments, organizations, and other entities with sufficient resources, can obtain the technological capabilities to deploy thousands of social bots and use them to their advantage, either to support or to attack particular political figures or candidates. Indeed, it has become increasingly simpler to deploy social bots, so that, in some cases, no coding skills are required to setup accounts that perform simple automated activities: tech blogs often post tutorials and ready-to-go tools for this purposes [1], [2], [3]. Various source codes for sophisticated social media bots can be found online as well, ready to be customized and optimized by the more technical savvy users (Kollanyi, 2016). We inspected several of these readily available bots and this is a (non-comprehensive) list of the capabilities that they provide: Search Twitter for phrases/hashtags/keywords and automatically retweet them; Automatically reply to tweets that meet a certain criteria; automatically follow any users that tweet something with a specific phrase/hashtag/keyword; Automatically follow back any users that have followed the bot; Automatically follow any users that follow a specified user; Automatically add users tweeting about something to public lists; Search Google (and other engines) for articles/news according to specific criteria and post them, or link them in automatic replies to other users; Automatically aggregating public sentiment on certain topics of discussion; Buffer and post tweets automatically. Most of these bots can run in cloud services or infrastructures like Amazon Web Services (AWS) or Heroku, making it more difficult to block them. Finally, a very recent trend is that of providing Bot-As-A-Service (BaaS): companies like RoboLike (<https://robolike.com/>) provide "Easy-to-use Instagram/Twitter auto bots" performing certain automatic activities for a monthly price. Advanced conversational bots powered by more sophisticated Artificial Intelligences are provided by companies like ChatBots.io that allow anyone to "Add a bot to services like Twitter, Hubot, Facebook, Skype, Twilio, and more" (<https://developer.pandorabots.com/>).





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Connectivity

# First Evidence That Social Bots Play a Major Role in Spreading Fake News

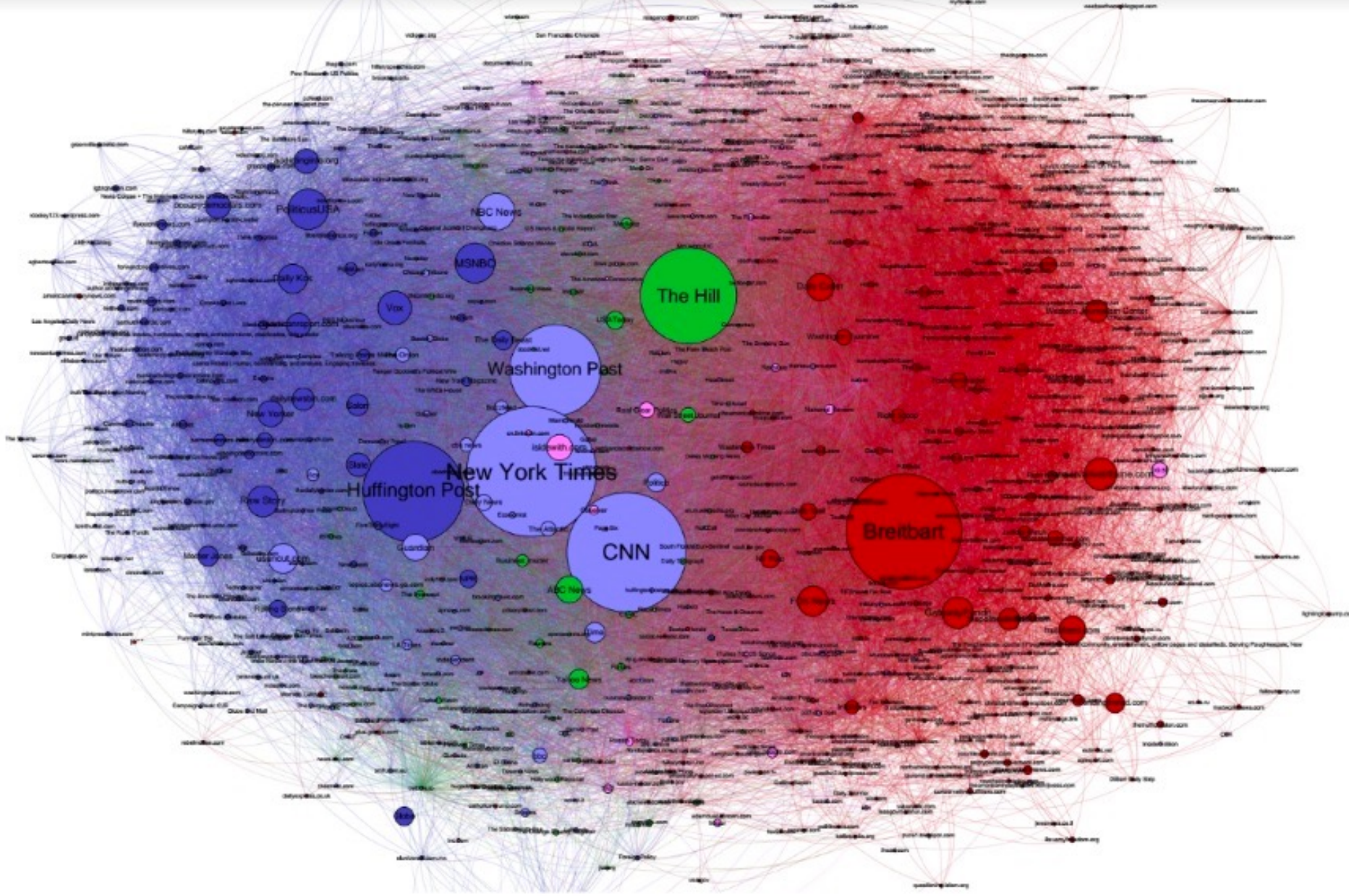
Automated accounts are being programmed to spread fake news, according to the first systematic study of the way online misinformation spreads

by Emerging Technology from the arXiv    August 7, 2017

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**Fake news and the way it spreads on social media is emerging as one of the great threats to modern society.** In recent times, fake news has been used to manipulate stock markets, make people choose dangerous health-care options, and manipulate elections, including last year's presidential election in the U.S.

Clearly, there is an urgent need for a way to limit the diffusion of fake news. And that raises an important question: how does fake news



Sites by partisan attention (Yochai Benkler, Robert Faris, Hal Roberts, and Ethan Zuckerman)

## POLITICAL SCIENCE

# Fake news on Twitter during the 2016 U.S. presidential election

Nir Grinberg<sup>1,2\*</sup>, Kenneth Joseph<sup>3\*</sup>, Lisa Friedland<sup>1\*</sup>,  
Briony Swire-Thompson<sup>1,2</sup>, David Lazer<sup>1,2†</sup>

The spread of fake news on social media became a public concern in the United States after the 2016 presidential election. We examined exposure to and sharing of fake news by registered voters on Twitter and found that engagement with fake news sources was extremely concentrated. Only 1% of individuals accounted for 80% of fake news source exposures, and 0.1% accounted for nearly 80% of fake news sources shared. Individuals most likely to engage with fake news sources were conservative leaning, older, and highly engaged with political news. A cluster of fake news sources shared overlapping audiences on the extreme right, but for people across the political spectrum, most political news exposure still came from mainstream media outlets.

In 1925, *Harper's Magazine* published an article titled "Fake news and the public," decrying the ways in which emerging technologies had made it increasingly difficult to separate rumor from fact (1). Nearly a century later, fake news has again found its way

social media have described its spread within platforms (5, 6) and highlighted the disproportionate role played by automated accounts (7), but they have been unable to make inferences about the experiences of ordinary citizens.

Outside of social media, fake news has been

We distinguished among three classes of fake news sources to allow comparisons of different operational definitions of fake news. The three classes correspond to differences in methods of generating lists of sources as well as perceived differences in the sites' likelihoods of publishing misinformation. We labeled as "black" a set of websites taken from preexisting lists of fake news sources constructed by fact-checkers, journalists, and academics (8, 9) who identified sites that published almost exclusively fabricated stories [see supplementary materials (SM) section S.5 for details]. To measure fake news more comprehensively, we labeled additional websites as "red" or "orange" via a manual annotation process of sites identified by Snopes.com as sources of questionable claims. Sites with a red label (e.g., Infowars.com) spread falsehoods that clearly reflected a flawed editorial process, and sites with an orange label represented cases where annotators were less certain that the falsehoods stemmed from a systematically flawed process. There were 171 black, 64 red, and 65 orange fake news sources appearing at least once in our data.

## Voters on Twitter

To focus on the experiences of real people on Twitter, we linked a sample of U.S. voter reg-

TECH

# Zuckerberg tells Congress Facebook is not a media company: 'I consider us to be a technology company'

PUBLISHED WED, APR 11 2018·10:27 AM EDT | UPDATED WED, APR 11 2018·10:51 AM EDT



**Michelle Castillo**  
@MISHCASTILLO

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[https://www.huffingtonpost.com/entry/mark-zuckerberg-regrets-fake-news-facebook\\_us\\_59cc2039e4b05063fe0eed9d](https://www.huffingtonpost.com/entry/mark-zuckerberg-regrets-fake-news-facebook_us_59cc2039e4b05063fe0eed9d)

**MEDIA** 09/27/2017 08:53 pm ET

830



# Mark Zuckerberg: 'I Regret' Rejecting Idea That Facebook Fake News Altered Election

He admitted this after Donald Trump claimed that Facebook was "always anti-Trump."



By Carla Herreria



Facebook CEO [Mark Zuckerberg](#) admitted on Wednesday that he was wrong to dismiss the idea that fake news shared on the giant social network affected last year's presidential election.

Zuckerberg's statement came in response to a tweeted attack from President [Donald Trump](#) hours earlier. Trump claimed that Facebook was "[always anti-Trump](#)" and accused it of colluding with news outlets that the president has deemed to be "fake news."



# Facebook targets 'false news' amid growing pressure from advertisers

By Marianna Spring

Specialist disinformation and social media reporter

🕒 30 June 2020



**What's missing?**

Get the whole story  
not just a headline.

Images can be faked.

Check what other people say.

The graphic features a central smartphone screen displaying a social media post. The post has a red header with a white exclamation mark icon and the text "scam alert" and "30 mins". Below the header is a red rectangular area. At the bottom of the screen, there is a section titled "covid-19" with three circular icons: a red bottle, a red virus particle, and a red hand. The background is blue with several blue virus particle icons. The Facebook logo is in the bottom right corner of the graphic. The word "FACEBOOK" is written in white capital letters on a dark grey background at the bottom right of the entire image.

Facebook's new media literacy campaign will ask users questions about what they see online

# Working to Stop Misinformation and False News

We know people want to see accurate information on Facebook – and so do we.

False news is harmful to our community, it makes the world less informed, and it erodes trust. It's not a new phenomenon, and all of us — tech companies, media companies, newsrooms, teachers — have a responsibility to do our part in addressing it. At Facebook, we're working to fight the spread of false news in three key areas:

- disrupting economic incentives because most false news is financially motivated;
- building new products to curb the spread of false news; and
- helping people make more informed decisions when they encounter false news.

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**Asia**

Oct 24th 2020 edition >

Anti-social network

# In Myanmar, Facebook struggles with a deluge of disinformation

Weeks before an election, Burmese social media are awash with fake news and vitriol





So social media sites are starting to label misinformation or take down posts. Is this a good idea? What else can be done to stop the spread of misinformation?