NSF Grant Documents Checklist:

- ✗ ~~Feedback on 1-pager from cognizant P.O.~~
- ☐ Internal Form
- ☐ New proposal created on Fastlane and edit/view access granted to AOR/SPO. PIN: XXXX
- ☐ Project Summary (manually enter FastLane)
- ☐ Project Description (see required sections below)
  - – ☐ Intellectual merit
  - – ☐ Broader Impact
  - – ☐ Relevance to Secure and Trustworthy Cyberspace
  - – ☐ Relevance to interdisciplinary DCL
  - – ☐ Motivation of EAGER support
  - – ☐ List of keywords (see program solicitation §V.A)
- ☐ References
- ☐ Budget
- ☐ Budget Justification
- ☐ Facilities/Resources
- ☐ Data Management Plan
- ☐ List of project personnel
- ☐ Collaboration Plan

Letters of Collaboration
  - – ☐ Collaborator 1
  - – ☐ Collaborator 2
- ✗ ~~IRB for data~~
- ✗ ~~Postdoc Mentoring Plan~~

Person 1
  - ☐ NSF Biosketch
  - ☐ Conflict of Interest
  - ☐ Current and Pending Support

Person 2
  - ☐ NSF Biosketch
  - ☐ Conflict of Interest
  - ☐ Current and Pending Support

DUE: **Dec. 12nd**

PPAPG: `https://www.nsf.gov/pubs/policydocs/pappg19_1/index.jsp`

Solicitation: `https://www.nsf.gov/pubs/2018/nsf18572/nsf18572.htm`

Overview

Tell reviewers what your project is about and why it is unique.

Intellectual Merit

Tell reviewers why your project is scientifically interesting.

Broader Impacts

Tell reviewers about other outcomes of your project beyond the science. Ideas include ancillary products, outreach, and more.

DCL: SaTC: Early-Stage Interdisciplinary Collaboration: Collaborative Research: *Socio-Algorithmic Newsfeed Interventions*

1 Introduction

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2 Background

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3 Research Plan

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4   Preliminary Results

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5   Project Timeline

Table 1 shows a timeline of the proposed activities. A new interdisciplinary effort requires extra coordination. The reader is invited to refer to the collaboration plan in the Supplementary Documents.

6   Intellectual Merit

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Table 1: Gantt chart of proposed activities

ACTIVITY/MILESTONE	YEAR 1			YEAR 2		
	Fall	Spring	Summer	Fall	Spring	Summer
Modeling & simulation of ASD	RA1					
CS conference submission (lead: RA1)				★		
Nudges / feedback design	RA2	RA2				
HabitLab software development		RA1	RA1			
Survey design			UG, RA2			
Data analysis (surveys, nudges / feedback)				RA2		
PolSci journal submission (lead: RA2)					★	
Robustness analysis					RA1	
Multidisciplinary journal submission (leads: RA1 & RA2)						★

Legend:
RA1: USF grad student   RA2: UMich grad student   UG: UMich undergrad student   ★: Milestone

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7 Broader Impacts

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8 Results from Prior NSF Support

RAPID: The Prevalence and Causes of Conspiracy Beliefs about Disease Outbreaks   Co-PI Nyhan was previously supported by NSF award #1659128 ($56,732; December 1, 2016–November 30, 2017).

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References Cited

Budget Justification

Personnel

Giovanni Luca Ciampaglia, Ph.D. Principal Investigator (Assistant Professor, University of South Florida) will lead the project and be primarily responsible for the research related to analysis of Facebook URL Shares dataset, the development of algorithms for news recommendation to diverse audiences, analysis of robustness of diversity-based recommender systems. Duties include research design, analysis, disseminating results of the research, and filing reports. He will mentor one graduate student at the University of South Florida (RA1), as well as any undergraduate researchers hired as part of REU supplements. Salary support is requested for 0.70 summer month of each year, with a 3% increase each year, for a total of $15,474.

Research Assistant. This proposal will support one graduate student as Research Assistants in years 1 and 2. The assistant (RA1) will be part of the Ph.D. program in Computer Science & Engineering at the University of South Florida, and will work under the supervision of PI Ciampaglia. The graduate students will be primarily responsible for developing algorithms for recommending news to a diverse audience, and for testing its robustness against shilling attacks via simulation and empirical analysis. Support for RA1 will be during the calendar year, for a total of $52,000.

Fringe Benefits

Fringe benefits for each award are calculated according to guidelines set by the University of South Florida. Fringe for faculty including retirement is 18% plus $1,473 for the cost of health insurance. Fringe for graduate students is 0.2% plus the cost of health insurance. The USF health insurance annual coverage 2019-20 for an RA is $2,371 ($890 for Fall, and $1,481 for Spring/Summer).

Graduate Student Tuition

Graduate student tuition rates for RA1 are calculated according to the guidelines set by the University of South Florida. For RA1, $39,010 is requested to support up to 18 credit hours per graduate student per year. USF tuition rates are $431.43 for In-State and $877.17 for Out-of-State.

Materials and Supplies

$1,850 is requested for miscellaneous supplies over the life of the project. These include the workstations, software, tools, and reference materials necessary to complete the proposed work.

Travel

The funds will be used to support the PI, graduate student, and any undergraduate students (from REU supplement) for travel expenses, broken down as:

1. $1,500 per year is requested for 2 domestic conferences;

2. $5,000 per year is requested for travel expenses of project personnel and of two unfunded collaborators — Dr. Filippo Menczer (Indiana University) and Alessandro Flammini (Indiana University) — for trips to Tampa, Fla. to visit PI Ciampaglia at University of South Florida, and to Ann Arbor, Mi. to visit Co-PI Nyhan at University of Michigan.

Travel reimbursements will be in accordance with Florida Statutes 112.061.

8.1   Direct and Indirect Costs

The University of South Florida has negotiated an indirect cost rate of 49.5% for federal grants (source: `http://www.usf.edu/research-innovation/sr/documents/indirect-rates.pdf`). Indirect is not charged on Permanent Equipment or Graduate Student Tuition.

Total Direct Costs of the project are $105,472. Total Indirect Costs: $44,528.

The total amount of this request is $150,000.

Facilities, Equipment, and Other Resources

The University of South Florida (USF)

The proposed research will be performed at USF, a high-impact, global research university dedicated to student success. USF was established in 1956 as a public university and is a comprehensive multi-campus research university serving more than 49,000 students. The USF System is an evolving multi-campus system of higher education with fiscally autonomous, yet complementary, independently accredited institutions located in Tampa (including USF Health), St. Petersburg, and Sarasota-Manatee. The university employs more than 1,800 full-time instructional faculty and over 7,400 full-time staff. It has a $1.7 billion annual budget, and an annual economic impact of $4.4 billion (source: USF).

Research Computing at USF

For any large-scale computational need, the project will utilize the advanced computing resources administered by the Research Computing (RC) unit at USF. RC hosts a cluster computer, which consists of approximately 500 nodes with nearly 7200 cores running Red Hat Enterprise Linux 6. The cluster is built on the condominium model with 24TB of memory shared across the nodes in various configurations. Remote system and file access is available from anywhere via a web interface, including computational job submission and monitoring. RC provides and supports more than 120 scientific software packages including GAMS, MATLAB, R, SAS, SPSS, COIN-OR, GLPK, and Julia. RC staff members are available to facilitate use of the cluster, as well as provide direct assistance with research projects that require high-performance computing. User education and training sessions are also provided several times per semester.

Department of Computer Science & Engineering at USF

The Department of Computer Science and Engineering at USF occupies a suite of offices and laboratories in a single building in the USF College of Engineering complex. Support from the full facilities, personnel, and equipment will be available for the duration of this project. The department operates several high performance computing platforms as well as numerous scientific workstations, Linux/Windows PCs, and dedicated Linux workstations. Recent upgrades include 2 16-core Linux servers with 128GB RAM each and 60TB of storage each to be used for the (/home) traditional storage for both faculty and students, and 5 8-core servers, with 32GB RAM and 1TB storage each, are used for file/print sharing, Active Directory, DHCP, DNS as well as web pages.

Collaboration with Indiana University (IU)

As part of this early-stage interdisciplinary collaboration, the PIs will engage with two additional collaborators during the course of this project — Dr. Filippo Menczer and Dr. Alessandro Flammini from the School of Informatics, Computing, and Engineering (SICE) at Indiana University Bloomington. Drs. Flammini and Menczer are included in this project as 'unfunded collaborators'; letters stating their intent to collaborate are attached as part of the Supplementary Documentation. Their contribution will be primarily focused on the development of algorithms for news recommendation to diverse audiences, robustness analysis, and simulation studies.

Collaboration with Drs. Flammini and Menczer will also let the PIs tap into resources available at Indiana University Bloomington. Before joining USF, PI Ciampaglia was a research scientist at Indiana University. He has worked in closed collaboration with Flammini and Menczer, and has retained access to IU's computer network and its computational resources.

Indiana University is a national leader in the deployment and use of advanced information technology and cyberinfrastructure in support of research and education. Some of the key facilities are described in the following.

Supercomputers and computer clusters

A number of systems provide researchers with access to some of the most powerful academic supercomputers in the US. These are: Big Red II, IU's flagship supercomputer (1,020 CPUs, 676 GPUs, 1 petaflop); the Karst high-throughput computing cluster (546 CPUs, 85.1 teraflops), and the recently-inaugurated Carbonate high-RAM cluster (1,920 CPUs, 22 terabytes of RAM, 76.8 teraflops), which recently replaced the aging Mason system and provides and 18-fold increase over its predecessor.

Advanced I/O and backup systems

The Data Capacitor II is a 3.5-petabyte distributed storage that provides extremely fast input/output and massive short-term storage, enabling analyses of very large data sets and very large scale simulations.

The Scholarly Data Archive (SDA) is IU's long-term backup and is capable of holding up to 15 petabytes of data. With mirrored tape silos on two separate campuses (in Bloomington and Indianapolis), this very secure (HIPAA-aligned) long-term storage system ensures that data are stored securely and reliably, even in the face of catastrophic technical failures or natural disasters.

Shared research servers

Thanks to previous funding from the NSF (Award No. IIS-0811994), a more nimble computational infrastructure will be also available for the duration of this project. These machines are part of the resources of the Center for Complex Networks and Systems Research (CNetS). The Center is a research unit within IU's SICE; Drs. Flammini and Menczer are some of its founding members and PI Ciampaglia spent time as postdoctoral fellow there prior to joining USF.

The machines are managed directly by CNetS members, with help from professional system administrators of SICE. They include four servers, each with 16 cores and large amounts of memory ranging from 32GB to 128GB. In addition to local storage, these servers are also attached to a 20TB shared GFS storage area network (SAN), with fast network I/O.

Data Management Plan

The main contribution of this research is the development of new methods for news recommendation in social media newsfeeds that prioritizes consumption from diverse (i.e., bipartisan) audiences. These research outcomes will be disseminated through peer-reviewed technical publications, source code releases, and benchmark data. The emphasis of data management will be on faithful and reproducible record keeping, with an emphasis on transparency and accountability in methods utilized.

Data storage and dissemination

Because of the interdisciplinary nature of this collaboration, results will be disseminated to multiple audiences, with a priority for journal/conference venues that cater to interdisciplinary audiences in the social sciences and in computer science. In particular, we will target archival Computer Science conferences such as RecSys, CHI, CSCW, ICWSM, WWW, KDD, and CIKM; multidisciplinary journals such as *Nature*, *Science*, *PNAS*, *Nature Communications*, *Nature Human Behavior*, *Science Advances*, *Scientific Reports*, *EPJ Data Science*, *Proc. Roy. Soc.: Interface*; non-archival interdisciplinary conferences like NetSci, CCS (Conference on Complex Systems), IC2S2 (International Conference on Network Science); and, finally, Political Science journals such as *American Journal of Political Science*, *American Politics Research*, *Public Choice*, *Political Research Quarterly*.

In addition to appearing on publisher's websites, preprint publications will be posted on both a project website and arXiv. Publications will be produced and stored on a commercial LaTeX host, such as Overleaf.

Source code will be developed and stored on commercial git systems, such as Atlassian Bitbucket or GitHub, in private repositories. Once results for techniques are published, source code will be open-sourced under the GNU GPL or equivalent license.

All project data will be stored on servers at University of South Florida and/or Indiana University.

Commercial Applications For commercial applications of our technology, we will adhere to the USF policy on intellectual property (source: `http://www.usf.edu/research-innovation/about-usfri/ policies.aspx`). Under this policy, we will work through USF's Patents and Licensing division.

Human Study Data All human study data will be secured in accordance with University's IRB requirements. This data will be anonymized and released on the project website in accordance with IRB requirements. For any data obtained from Social Science One, LLC, we will follow any additional requirements from Social Science One and its institutional partners (such as the Social Science Research Council and Facebook, Inc.).

Data Retention

All data generated under this project will be maintained for the life of the project. At the conclusion of the project, data related to major findings and software developed will be archived at the University of South Florida for a period of no less that 5 years. Source code stored externally and archival publication preserves those records indefinitely.

Data Protection

Data will be stored on one or servers that offer RAID protection for data, preserving the data in the case of any single hard disk failure. If more than one disk is lost, we rely on cloud-based data backups to Google Drive and Box. Data is constantly synchronized meaning that in the case of total failure, only very recent changes may be lost. For source code, the commercial services we plan to use (i.e., Overleaf, Bitbucket, GitHub, etc.) offer high-levels of reliability for long-term storage.

Data Privacy

Data access is primarily controlled via IP restrictions and Access Control technologies. For further protective siloing, only members of this project will have access to sensitive project materials. Commercial storage services offer similar access control.

Project personnel

1. Giovanni Luca Ciampaglia; University of South Florida; PI,
2. Brendan Nyhan; University of Michigan; Co-PI,
3. Filippo Menczer; Indiana University; Unpaid collaborator,
4. Alessandro Flammini; Indiana University; Unpaid collaborator.

Collaboration Plan

The project team spans three different institutions (University of South Florida, University of Michigan, and Indiana University) and various disciplines — computer science (Ciampaglia and Menczer), political science (Nyhan), Physics (Flammini and Menczer), and network science (Ciampaglia, Flammini, Menczer). Ciampaglia, Menczer, and Flammini have collaborated together in the past, and they have considerable experience bridging computer science, physics, and network science in their work. Even though Ciampaglia recently joined a new institution, they keep in touch on a regular basis as part of ongoing projects. It is the first time that the three of them collaborate with Nyhan, bridging a new discipline (political science). Therefore, to guarantee success at such an early stage of a new interdisciplinary collaboration, it is important to imbue the activities of the team with some structure regarding coordination and communication.

PI Ciampaglia will lead the project; he will mentor one graduate student at USF for the full duration of the project, and will be responsible for coordinating the three institutions. Co-PI Nyhan will mentor on graduate student and one undergraduate researcher for part of the project. The two groups, together with collaborators Flammini and Menczer, will communicate on a regular basis via teleconferencing software (Zoom or Skype). These meetings will be the primary venue of communication of the joint collaboration. During them, research assistants will give updates and present preliminary results to the rest of the team. Goals and activities for the next period will be discussed and agreed upon by the whole team in a collegial way.

The use of additional channels of communication (e.g. Slack, Google Groups) will be evaluated by the team as the need arise, but in general electronic communications outside of meetings will be kept at a minimum: Email will be used for scheduling meetings and to share brief updates and external materials; it will not be used for in-depth conversations. Github issues (or a suitable issue tracking system) will be used to keep a record of conversations about software development, especially at the stage when software will be released to the public and will attract external users.

In addition to teleconference meetings, the team will also meet in person. Funds have been requested to support travel expenses of Flammini and Menczer from Indiana University to University of South Florida, where Ciampaglia will host them for short visits during the summer. The same funds may also be used to support the travel of either Ciampaglia and/or the USF research assistant to University of Michigan, to meet with Co-PI Nyhan and his team there. Regardless of the destination, these short visits will be used as 'sprints', for example to finalize manuscripts or to let team members work in close collaboration on software development and/or data analysis.