RESEARCH SEMINARS: A NEW HOPE

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A long time ago, in a world that now seems far, far away, the Boston area hosted seven weekly research seminars in number theory. Frustrated by the task of scanning the seminar homepages every weekend to find talks of interest, one of us (Edgar Costa) created a website to collect them automatically into one page. That site, Bean Theory, proved to be a valuable resource for local number theorists, especially those new to the community.

When the pandemic reached the U.S. and we moved our seminars online, we were pleasantly surprised to see some mathematical friends from faraway places participating. We realized that audiences for seminars like ours might be even larger if there were an effective way to advertise them. Conversely, there might be online seminars that we might like to attend, if only we knew about them. This inspired two of us (Edgar Costa and David Roe) to begin creating a website that mathematicians worldwide could use to find seminars, listed in their own time zone, with direct videoconference links. Because of our experience developing Bean Theory and the L-functions and Modular Forms Database (a database of objects in arithmetic geometry), we were able to get a running start. The rest of us soon joined in designing and developing the site, which we called `mathseminars.org`.

Even though we all put aside other work to complete our project quickly, we were not the first to produce a website listing online mathematics seminars. By the time our site was ready, a few other websites existed, but our site had the advantage that its content was crowdsourced. We realized from our experience with Bean Theory that this would make it easy for our list to grow: any seminar organizer with a web browser could add new talks without our direct involvement, after being endorsed by any other content creator on the site (a measure intended to reduce spam).

And indeed it grew, even faster than we had anticipated! During the first 28 days after the April 10, 2020 launch, the site received 411,015 page views from 83,618 visitors.

> "`mathseminars.org` is like the departure board at O'Hare if you could just get on any flight you wanted and they were all free!" —Jordan Ellenberg

Mathematicians thanked us for enabling them not only to continue learning about new research but also to reconnect with their colleagues at a time when many were feeling isolated. Conference organizers scrambling to host events online found that they could run them entirely on our site. The American Mathematical Society decided to partner with our site. Researchers in physics asked if their seminars could be included; in response, we developed functionality to include fields beyond mathematics and renamed the site `researchseminars.org` to reflect its broader scope. As of September 2020, the site covers biology, chemistry, computer science, earth sciences, economics, and physics in addition to mathematics. We continue to add new

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fields as soon as there is sufficient demand and expert consensus on what the subtopics should be.

Do we expect `researchseminars.org` to continue growing after in-person talks become common again? Yes! Many features we incorporated were designed to be useful for in-person seminars as well:

- the site relieves organizers of the task of designing their own seminar website, while still letting them embed the seminar schedule on an external website;
- it lets speakers enter and update their talk information without burdening organizers;
- it gives participants one place to find all talks in their vicinity;
- it allows participants to filter conferences and talks according to their interests;
- it allows participants to subscribe to a single personalized calendar that updates automatically as new talks are added;
- it provides a central repository with links to slides and video recordings; and
- it provides a historical record.

Despite the challenges posed by the sudden transition to online research, hosting talks virtually also has benefits. Attending a talk no longer requires proximity to the host institution, only a reliable internet connection. Researchers with health issues or family obligations can participate more easily. Finally, hosting events online reduces travel, saving researchers' time and reducing their carbon footprint. Now that organizers have experienced some of these benefits, we hope that many in-person seminars will include an online presence going forward, and we designed our site to facilitate this.

We invite all researchers to explore `researchseminars.org`, contribute conferences and talks, and help spread the word! We encourage researchers in fields not yet covered to assemble a group of colleagues willing to help plan and promote a new section of the site. Many improvements to the website are still possible, and the code is open source, so people enthusiastic about building a better site are welcome to join the project; many others have already contributed.

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URL: `https://math.mit.edu/~edgarc/`

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