CALYX INSTITUTE

ANNUAL REPORT

May 1st, 2020 — April 30, 2021

CALYX

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MISSION & OBJECTIVES

THE CALYX INSTITUTE is a not-for-profit education and research organization devoted to studying, testing, developing, and implementing privacy technology and tools to educate the public and promote free speech, free expression, civic engagement and privacy rights on the Internet and in the mobile telephone industry.

The mission of The Calyx Institute is to educate the public about the importance of privacy in digital communications and to develop building blocks that Internet users and service providers alike can use to build "privacy by design" into their Internet experience. Calyx seeks to incorporate privacy and anonymity controls into services at root levels, and make these controls easy for all people to access and use. In order to achieve the ultimate goal of reinforcing the fundamental right to freedom of expression, we seek to make robust privacy tools and ubiquitous strong encryption available to everyone.

LETTER FROM THE EXECUTIVE DIRECTOR

LAST YEAR WAS HARD. The COVID-19 pandemic combined with violent attacks on democracy worldwide have left most, if not all, of us at The Calyx Institute and in the wider Internet Freedom community shaken and bruised. Throughout this, many technologies and tools that should have made things easier instead caused complications and chaos.

The stories, whether covered by journalists or told by family and friends, were endless: keeping in touch with loved ones despite spotty Internet connectivity; trying to pass exams with racist or simply inept proctoring software; or calculating how to pay for groceries when unemployment assistance databases malfunctioned. And at each step, our privacy was stripped away, our activities monitored and logged, and our personalities algorithmically sorted by companies who want to know everything about us, while revealing nothing about themselves.

We were driven by two ideas over the past year. The first was to reduce complications and headaches for our members and users of our privacy-protecting technology. With CalyxOS, we wanted to put privacy and security in the hands of people who just wanted their phones to work out of the box. For our Membership Program, we tripled the number of staff so we could respond to members as quickly as possible. Our Microgrants Program reduced the application and reporting paperwork to a minimum. There are more examples later in this report.

We were also inspired by those who dedicated themselves to mutual aid in a year where it was sorely needed. Our neighbors and friends inspired us by setting up refrigerators and pantries full of free food for those in need or by coordinating vaccine sign-ups for the elderly or those unfamiliar with the complicated signup processes. Because the Internet Freedom community was hit hard by the financial repercussions of the pandemic, we sought out ways to provide support, financial or otherwise, to organizations and projects that were struggling. To this end, we expanded our Microgrants program and increased the amount of financial aid we disbursed to organizations who share our mission of making privacy and online security available to all.

Making it simple and supporting those around us - We know that The Calyx Institute still has a lot of work to do in these areas. But in a year that was difficult for everyone (and not equally so), these ideas have us re-energized and re-dedicated to our mission. ▼
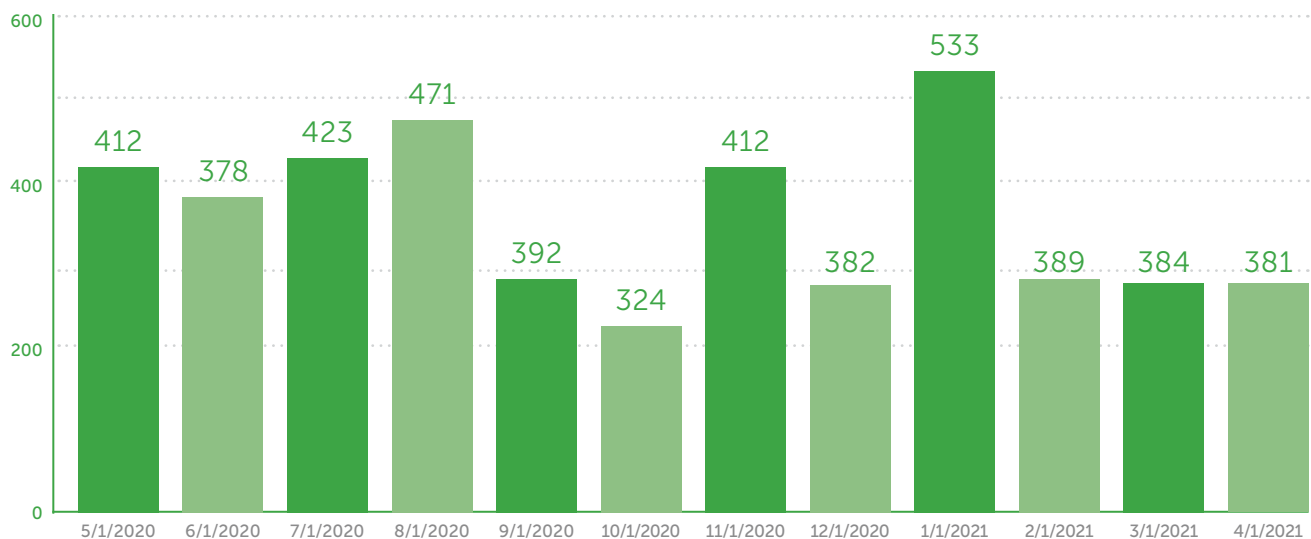
Nicholas Merrill — EXECUTIVE DIRECTOR

MEMBERSHIP PROGRAM

Membership Growth

THE CALYX INSTITUTE'S membership program helps bridge the digital divide in the United States through our wireless hotspot program, while simultaneously providing the primary source of funding for our program activities. The wireless hotspot program, which we offer through a partnership with Mobile Citizen, provides connectivity to underserved communities through annual or quarterly memberships. Members gain access to the Internet throughout the country on Sprint's 4G network, without onerous and often expensive data caps and hidden fees.

As of the end of this fiscal year, The Calyx Institute's membership has increased to over 6,500, nearly doubling the number of members over the previous year. This continued growth is a testament to the strong foundations and improvements made to the membership program last year, and to the hard work and dedication of the membership team who worked diligently to support our members with timely responses to questions and requests for assistance, information about digital privacy and online security, and by directing them to our digital services program during a very difficult year.

Date	Value
5/1/2020	412
6/1/2020	378
7/1/2020	423
8/1/2020	471
9/1/2020	392
10/1/2020	324
11/1/2020	412
12/1/2020	382
1/1/2021	533
2/1/2021	389
3/1/2021	384
4/1/2021	381

New Helpdesk

After years of working with Request Tracker, we transitioned our helpdesk support to Zammad, an open-source helpdesk and ticket tracking system. Zammad is built to integrate with future Calyx Institute projects. For example, Zammad has a modern REST API, which will allow us to use it as the backend for our forthcoming bug reporting and feature request app we are developing for CalyxOS. By modernizing our helpdesk system, we will improve the onboarding experience of new membership coordinators, ensure more timely responses, and improve our analytics and issue-tracking to identify common questions and complaints. Members now experience faster response time and quicker resolutions to issues. ▼

DIGITAL SERVICES

THE CALYX INSTITUTE develops and operates a range of digital services to support online privacy and security for the general population and at-risk users. These services run on open-source platforms that allow other service providers to use them to build "privacy by design" into their Internet experience. Millions of Internet users around the world directly benefit from our digital services each year as we continue to develop even more robust features and better user experience.

These services are and always will be free to use and free for other service designers to borrow and incorporate into their own platforms. Our commitment to privacy and security means that we keep the minimal amount of information required to run our digital services.

CalyxVPN

The Calyx Institute operates our own Virtual Private Network (VPN) running on the Bitmask platform. The CalyxVPN is accessible through the Bitmask app on Android, or through the standalone CalyxVPN app on F-Droid. It can carry up to 20 Gb/s of traffic.

CalyxVPN received more support this year with another grant from Internews to improve the Pluggable Transports integration with the Bitmask platform and CalyxVPN implementation. Internet censors can block traffic that's protected by a VPN by using Deep Packet Inspection (DPI) to target services by filtering packets. Pluggable Transports obfuscate traffic routed through a VPN by making it look just like approved traffic. We are excited to continue working with the Bitmask developers at the LEAP Encrypted Access Project.

Tor Hosting

Support for the Tor Network, an online anonymity and censorship circumvention platform developed by The Tor Project, is a keystone of The Calyx Institute's program activities. We have contributed to and supported the Tor network since our founding, by both hosting relays that carry traffic on the network, and through innovative uses of the Tor network in conjunction with other software and communications platforms, such as Mumble, Jabber/XMPP, and the CalyxOS operating system. The Calyx Institute also hosts an official mirror of the Tor Project site to allow users to find more information about Tor and to download the Tor Browser if the main website is blocked.

To further support the Tor Network, we received a grant from the Naval Research Lab, where the onion routing systems that underpin the Tor network were first developed, to generate more data to be used in the design and analysis of traffic-security through anonymous communications networks like the Tor network. This project will allow researchers and developers to improve the performance, usability, and secure distribution of network information.

Online Chat

The Calyx Institute continued to operate an experimental free public conferencing server that provides chat service using XMPP, the open-standards protocol for instant messages and voice communication. This server is also reachable via a Tor Onion Service. We also continued hosting Calyx Meet, our instance of Jitsi, a secure online video conferencing tool to carry more traffic and present a smoother, cleaner experience for users. We also host an instance of the voice chat application Mumble, available through the regular web as well as through Tor Onion Services. ▼

CALYXOS

DEVELOPMENT OF THE CalyxOS operating system took off in 2021 as interest and positive publicity of the project grew. CalyxOS now has over half a dozen developers working on the project regularly. Additionally, Maya Ninova joined our team to conduct research on CalyxOS users that has directly informed our development plans. We added new features, improved existing ones, and kept our promise of monthly automatic over-the-air security updates to users, while also revamping our public presence, creating and expanding online communities for CalyxOS users to gather, share information, request help, and volunteer ideas and support.

CalyxOS Development

This year, we added compatibility for the Google Pixel 4a, Pixel 4a (5G), and Pixel 5, bringing the number of compatible devices to 12. User-feedback and The Calyx Institute's goals identified low-cost phones as a priority, and we continue to work to make CalyxOS available on more affordable devices. In order to reach a truly global audience, we launched a translation project for CalyxOS, making great progress on French, German, and simplified Chinese. CalyxOS was also ported to Android 11 three months after its release, ensuring users have access to the latest Android security and privacy features.

To ease the process of onboarding onto CalyxOS, we published a command-line device flasher to automate the process of flashing CalyxOS onto compatible devices. The device flasher is part of the AOSP Alliance and is usable by several other operating systems.

Not only has CalyxOS gained general stability improvements across the board, but we have added a wide range of new features to it. Highlights include:

- Datura, a simple firewall app that allows users to restrict WiFi, mobile data, and VPN usage on a per-app basis, while still letting them use a VPN of their choice.

- Lockscreen PIN scrambling. Users have the option to enable lockscreen PIN scrambling to thwart over-the-shoulder surveillance.

- Phone Dialer: support for 'Sensitive Numbers' feature, where calls to numbers for help lines such as domestic violence, child abuse, suicide hotlines are not recorded in the call log. These numbers are also available
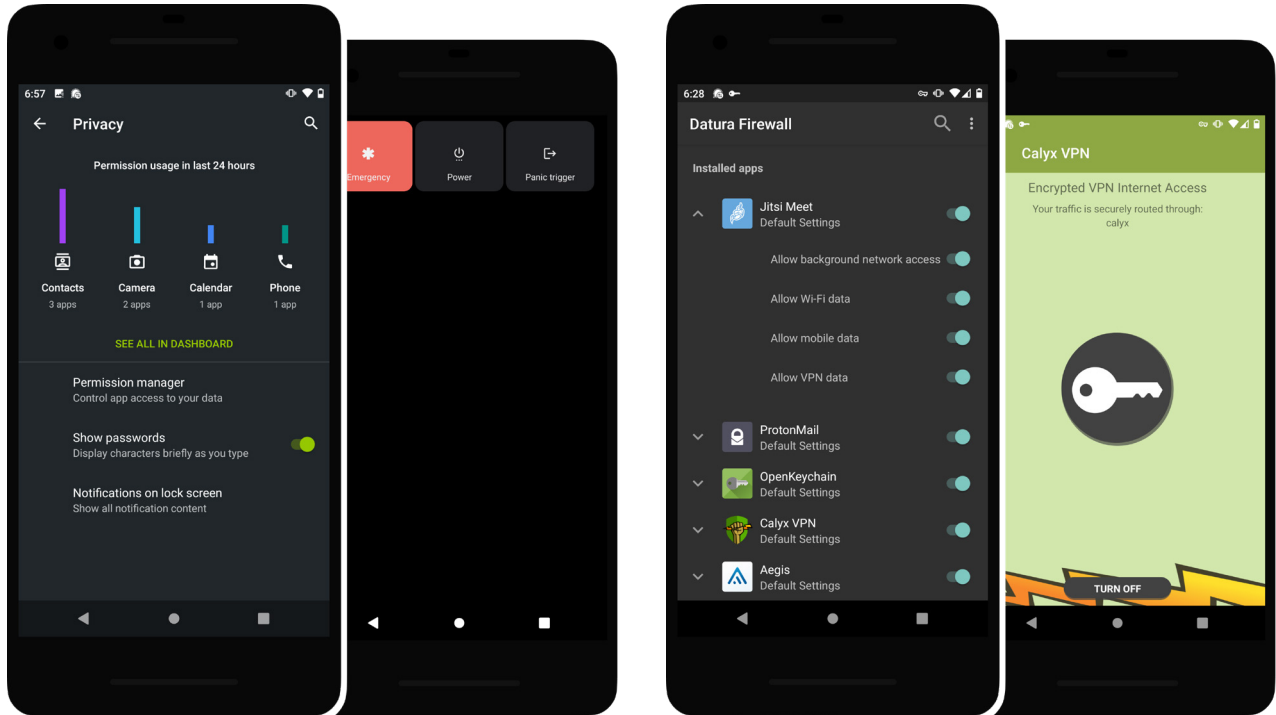
from a menu entry, Helplines. The dialer also incorporates encrypted text and voice apps Signal and WhatsApp, and notifies users when a call is not encrypted.

• E-SIM and dual SIM support on all devices where it is supported. This feature helps CalyxOS meet the needs of users around the globe.

• Bluetooth and WiFi timeout feature allows users to shut off Bluetooth when no devices are connected and shut off WiFi when not connected to any network after user-definable period of inactivity, reducing the attack surface of the device and saving battery power.

We also improved SeedVault, a built-in encrypted backup and restore suite for online (using NextCloud) or off-line backups (using USB storage) of the phone's data and apps. SeedVault was ported to Android 11 and received a wide range of design, UI, and UX improvements. Additionally, SeedVault can now back up call logs and local contacts, and users can now verify their recovery code or generate a new one. SeedVault received financial support from NLnet Foundation, and is used by most Android custom ROMs, such as AOSP Alliance members CalyxOS, RattlesnakeOS, and Robotnix, as well as LineageOS and other projects.

CalyxOS Community and User Research

We also conducted our first study of CalyxOS users this year. Supported by Internews' BASICS program, this study had CalyxOS users fill in an online diary log for 9 days and participate in a final interview. We followed the user journey

from researching CalyxOS to potentially advocating for others to adopt the operating system. This study's findings and suggestions led to recommendations that have positively impacted CalyxOS's development, design, and community building.

Building on this research, we developed a user personas project to uncover different user types for CalyxOS, focusing on both current and target users, including individuals working in risk environments and organizations supporting these professionals. A total of 32 qualitative interviews were conducted with people from more than 15 countries for both groups. This research will inform future activities and ways to better support people at risk.

To help build community and present a welcoming public face for the project, we debuted a fully redesigned website, calyxos.org. Our user research indicated a "need to see a well-documented website with information about the project, the included features, apps, information about updates and stage of development." We continue to respond to feedback by adding FAQs and a Wiki to the website to provide potential and current users with information they are seeking.

The growing number of potential and current CalyxOS users can now meet and interact on several platforms. We launched a Reddit page that currently has over 1,700 members, while CalyxOS's linked Matrix, IRC, and Telegram channels have several hundred users. We have received positive feedback and reviews not only of CalyxOS, but of our welcoming community as well. One Android ROM reseller has even switched over to providing CalyxOS phones exclusively.

The CalyxOS community isn't limited to CalyxOS users and developers. CalyxOS Lead Developer Chirayu Desai organized the Android Open Source Project (AOSP) Alliance in 2020. The AOSP Alliance is a collaborative project between privacy and security focused Android-based OS's. AOSP Alliance members currently include CalyxOS, #!os, RattlesnakeOS, and Robotnix. By bringing them together in the AOSP Alliance, we've reduced redundant work and increased collaboration and idea sharing. ▼

COMMUNITY SUPPORT

Microgrants and Small Projects Support Program

THIS YEAR, OUR Microgrants and Small Projects Support Program helped individuals, projects, and organizations that advance The Calyx Institute's mission. This program supports digital security and privacy education and software development through timely financial support generally ranging between $2,500 - $7,500. The program prioritizes project maintenance, interim funding between larger grants, experimental projects, and gateway funding to help new projects gain momentum.

Library Freedom Project (LFP) is a privacy-focused community of practice for librarians. LFP's community of librarians are working with their teen patrons to create high-quality privacy resources for young people focused on their unique needs. Teens regularly make decisions that obfuscate information from certain parties, like principals or parents, and use anti-surveillance strategies such as anonymous accounts or "finstas." But there remains a need for a robust set of privacy resources made just for teens, on topics they care about, using language and formats they understand. We will build this shareable set of resources with our teen patrons by working with teens from our libraries to create a set of privacy resources for people ages 13-19, prioritizing the needs of Black, Indigenous, and People of Color (BIPOC) and LGBTQ teens. More information can be found at https://libraryfreedom.org/

Lucy Parsons Labs (LPL) is a charitable Chicago-based collaboration between data scientists, transparency activists, artists, & technologists that sheds light on the intersection of digital rights and on-the-streets issues. LPL is using public records laws to investigate and extensively document where fusion centers are using facial recognition technology. Due to the disparate and decentralized nature of fusion centers, they don't always share the same tactics, techniques or procedures. LPL will create maps and other visualizations focused on fusion centers to help report the relationships between fusion centers and local police and how technology has proliferated from the federal government to the local level. More information can be found at https://www.lucyparsonslabs.com/

SignalBoost is an open-source tool that lets activists, journalists, rapid response workers, and everyone else use Signal to send text blasts and receive hotline tips with minimal metadata exposure. It is designed for situations in which organizers need to spin up secure communications loops quickly for massive groups of strangers. SignalBoost improved the scalability, maintainability, and usability of their tool as part of this grant during a period of rapid growth. Calyx Institute support acted as gateway funding, helping the SignalBoost team focus on the project full-time while pursuing long-term funding. SignalBoost is now fiscally-sponsored by Aspiration Tech, has received Emmerson Collective

Fellowships, and received a $100,000 grant from Mozilla. More information can be found at https://signalboost.info/

The Surveillance Technology Oversight Project (S.T.O.P.) is a non-profit advocacy organization and legal services provider that litigates and advocates for privacy, working to abolish local governments' systems of mass surveillance. S.T.O.P. is producing two educational reports on the impact of Community Control of Police Surveillance (CCOPS) Legislation. CCOPS is a combined effort by a wide range of nonprofits focused on increasing community oversight of and transparency about privacy-invasive technologies used by government agencies and departments throughout the country. Legislation modeled on the CCOPS initiative has passed in over a dozen towns, cities, and counties. The first report, "New CCOPS on the Beat", was released in February 2021. It examined the range of statutes that have been enacted to date, creating a framework for evaluating the implementation of specific CCOPS laws in varying jurisdictions. A second report will apply this framework to the first round of NYPD privacy and use policies per the POST Act. More information can be found at https://www.stopspying.org/

Team CommUNITY, a program of ARTICLE 19, offers a variety of in-demand services to the International digital rights community, which is made up of open-source technologists, frontline human rights defenders, and researchers. Calyx Institute support provided interim funding for Team CommUNITY to offer critical programming and training and continue important conversations during a time that individuals are unable to gather at the Internet Freedom Festival because of COVID-19. More information can be found at https://www.digitalrights.community

Distributed Denial of Secrets (DDoSecrets) is a non-profit that exists to enable the free transmission of data in the public interest, promote and support journalism, freedom of speech and government and corporate accountability. They engage in outreach, education, advocacy, and other work primarily through their collaborative index of datasets. The Calyx Institute will support infrastructure costs, including hosting, web development, and seeding capabilities for the nearly 50 TB of data in DDoSecret's archive. More information can be found at https://www.ddosecrets.com ▼

CONFERENCES & CONVENINGS

AS PART OF THE Internet Freedom Festival's virtual VPN Village, Senior Technologist Elijah Waxwing gave an introductory workshop on September 8, 2020, on VPNs designed for folks that want to understand what a VPN is, how it works, and how it differs from other tools like Tor.

Senior Membership Coordinator Catie Wilkinson co-organized and spoke at the Ban the Scan rally in New York City on April 17, 2021, against government use of facial recognition technology. Catie and Junior Membership Coordinator Brandon Sandoval have also spoken multiple times on CryptoHarlem's livestream events.

CalyxOS lead developer Chirayu Desai presented at rootconf's Data Privacy Conference. This online conference took place from April 23 – 29, 2021. Chirayu presented on "Integrating privacy-preserving analytics into your application" and a "Case Study of CalyxOS."

GROWTH & CHANGE

Pandemic and Political Turbulence

THE GLOBAL COVID-19 pandemic strained The Calyx Institute and staff productivity. While prioritizing the health and well-being of our team, we have kept up with continuous growth in the Membership Program, additional staff and contractor hiring, new grants, and the challenge of supporting the broader digital rights community during a period of financial, political, and public health uncertainty.

The Calyx Institute team consists of full-time and part-time employees, contractors, and volunteers. In addition to the team, our work is made possible by hundreds of friends, allies, and colleagues working individually or as part of other organizations and projects devoted to online privacy, security, and free speech.

New Contributors

Jahmil Roberts, Junior Membership Coordinator. Jahmil is a community chef and professional, creating spaces of connection and healing through rituals of gathering and sharing. They work to experience more freedom through the bypassing of systems.

Brandon Sandoval, Junior Membership Coordinator. Brandon cares deeply about making connections and opening up conversation around the topics of culture, justice, and alternative economies.

Ese Udom, Android and Backend Developer. He has been writing Java since 2012 and Android since 2013. He has worked on a couple of apps for private and government organizations including a human trafficking report app and music streaming app. He works remotely from Nigeria.

Maya Ninova is a researcher and consultant with broad international research and mentoring experience in transdisciplinary and multicultural teams. She writes regularly on topics related to design, culture, user behavior and online social phenomena and teaches subjects related to social sciences and applied research. Maya works with The Calyx Institute through the support of Internews BASICS Program.

Oliver Scott, Android Engineer, has been working on Android since 2016. He has worked on various system-level features and apps as well as the build system and tools. He holds a Bachelor's degree in Computer Science and works remotely from Ontario, Canada.

Hans-Christoph Steiner is a privacy researcher and UX-focused hacker. He works to fulfill the dream of the phone that fully respects the user and their privacy as part of CalyxOS, Guardian Project, F-Droid, Tor Project, and Debian. Recent work includes "Clean Insights" privacy-preserving metrics, "Tracking the Trackers" app inspection tools, and TorServices embeddable Tor for Android.

Advisory Committee

The Calyx Institute is part of a community, and we rely on the advice, support, and assistance of our friends and colleagues to advance our mission and to give back to the network of organizations and individuals who share our values, vision, and goals. To further these ends, we relaunched our Advisory Committee this year in order to formalize our relationship with individuals who advise and support The Calyx Institute, and to publicly recognize them for their work.

The Advisory Committee is comprised of experts in privacy and online security law, policy, and technology with whom we share information and updates about our current projects and accomplishments in order to raise awareness of what we're doing and receive feedback on our work and suggestions on how to advance our mission. The Committee also helps us identify challenges and roadblocks, and provides advice, support, and assistance in overcoming them.

The relaunched Advisory Committee is comprised of the following individuals (titles and affiliations used for identification purposes only):

Isabela Bageuros, EXECUTIVE DIRECTOR OF THE TOR PROJECT
Matt Mitchell, TECHNOLOGY FELLOW AT FORD FOUNDATION
Sascha Meinrath, PALMER CHAIR OF TELECOMMUNICATIONS AT PENN STATE UNIVERSITY
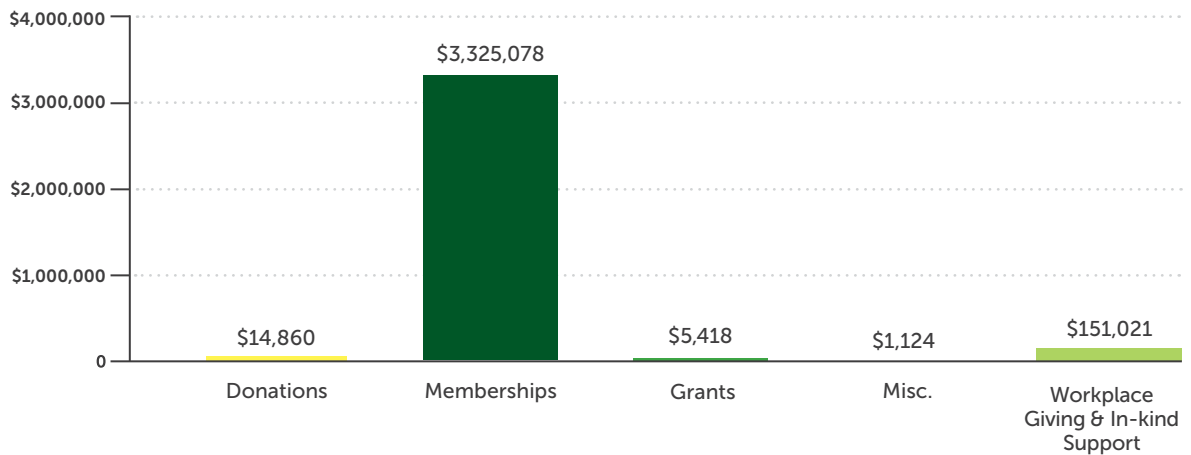Sandra Ordonez, HEAD OF TEAM COMMUNITY, A PROJECT OF ARTICLE19
Enrique Piracés, PROGRAM MANAGER AT THE CENTER FOR HUMAN RIGHTS SCIENCE, CARNEGIE MELLON UNIVERSITY
Jonathan Askin, PROFESSOR AT BROOKLYN LAW SCHOOL, AND FOUNDER OF THE BROOKLYN LAW INCUBATOR & POLICY CLINIC

FINANCIALS

CALYX RECEIVED the majority of our funding through our growing member-ship program. The Calyx Institute received $3,497,083.00 in income and had $2,322,846.00 in expenses.
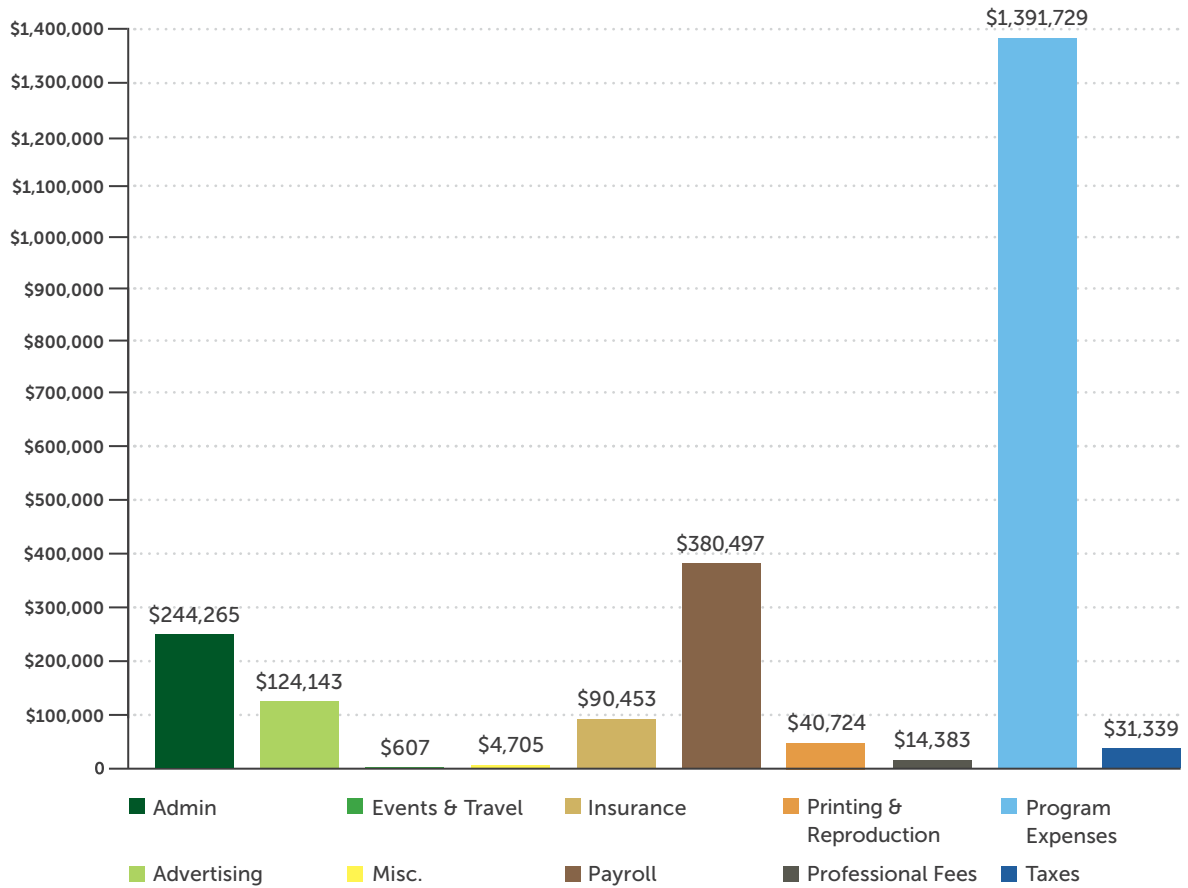
Income

$3,325,078 (Memberships)

$14,860 (Donations)
$5,418 (Grants)
$1,124 (Misc.)
$151,021 (Workplace Giving & In-kind Support)

Total Income — $3,497,083

LEGEND   Donations and Grants: financial contributionstoward Calyx's mission.

Memberships: income received as part of Calyx's membership program.

Workplace Giving & In-kind Support: workplace donations, and non-monetary support.

Miscellaneous: includes interest and other small amounts not otherwise categorized.

Expenses

Bar chart of expenses:
- $244,265 — Admin
- $124,143 — Advertising
- $607 — Misc.
- $4,705 — (Insurance category area)
- $90,453 — Insurance
- $380,497 — Payroll
- $40,724 — Printing & Reproduction
- $14,383 — Professional Fees
- $1,391,729 — Program Expenses
- $31,339 — Taxes

Legend:
- Admin
- Advertising
- Events & Travel
- Misc.
- Insurance
- Payroll
- Printing & Reproduction
- Professional Fees
- Program Expenses
- Taxes

Total Expenses — $2,322,846   Net Income — $1,174,237

LEGEND

Admin: expenses necessary to running The Calyx Institute that are not specifically attributed to specific programs, including bank service charges, costs associated with our Brooklyn, NY office, and postage & shipping costs.

Advertising: mostly in-kind contributions received as part of the Google Ads Grant.

Events & Travel: costs associated with events, conferences and meetings.

Miscellaneous: includes depreciation and other expenses not otherwise categorized.

Insurance: includes employee health insurance and organizational insurance.

Office Equipment: hardware, software and other equipment.

Payroll: Calyx Institute staff salaries.

Printing and Reproduction: stickers, buttons and other printed material given to members and others who want to show their support of The Calyx Institute.

Professional Fees: contractor payments for accounting, graphic design, and legal work.

Program Expenses: costs associated with Calyx's programmatic activity, such as contractors and hardware, including CalyxOS, educational programs, our Micro-Grants program, and our digital services such as Tor hosting, as well as the costs of our Membership Benefits.

Taxes: mostly payroll taxes.