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SAVE THE DATE!

12th Annual Meeting and Symposium

Thursday, September 12th, 2019

Museum of Flight

WASHINGTON STATE
11 Academy of Sciences
TH ANNUAL MEETING & SYMPOSIUM
September 13, 2018 | Museum of Flight, Seattle, WA

FULL DAY AGENDA

- 8:00 am – 12:00 pm **Registration**
- 8:00 am – 8:45 am **Continental Breakfast**
- 8:45 am – 11:30 am **Business Meeting** – Members only
- 11:30 am – 11:45 am **K-12 Awards and Recognition**
- 11:45 am – 12:30 pm **Lunch**
- 12:30 pm – 5:30 pm **Symposium**
- 6:15 pm – 7:00 pm **Reception for Members, Speakers, and their Guests**
- 7:00 pm – 9:00 pm **Dinner and Induction of New Members**

11TH ANNUAL BUSINESS MEETING AGENDA

- 8:00 Registration and Continental Breakfast
8:45 Call to Order, Welcome and President's Report
Where We've Been; Looking Forward
Anjan Bose, President

Where We've Been

- 9:00 Secretary's Report
Don Baer, Secretary
- 9:05 Treasurer's Report
Cathryn Booth-LaForce, Treasurer
- 9:15 Introduction of New Officers and Board Members
Anjan Bose
- 9:20 Membership Committee Report
Dave Eaton, Membership Committee Chair
- 9:30 Communications Committee Report
Roger Myers, Communications Committee Chair
- 9:40 K-12 Committee Report
Pinky Nelson, Education Committee Chair
- 9:45 Topical Working Group Reports
Reports on current projects from TWG leadership
- 9:55 Emerging issues WSAS could/should be working on
Discussion facilitated by Anjan Bose
- 10:15 Break

Looking Forward

- 10:40 Section Meetings – Engaging Members
In section meetings, members will discuss issues raised during the emerging issues session; ways to mobilize WSAS member involvement, including in section leadership; new member nominations; and member portfolio and diversity.
- 11:20 Reconvene; brief report from each section. 2 min per section
Reporting out led by incoming Membership Chair, Jud Virden
- 11:30 K-12 Awards and Recognition
Pinky Nelson, Education Committee Chair
- 11:45 Adjourn 11th Annual Business Meeting
Anjan Bose
- 11:45 Lunch

PRESIDENT'S 2018 ANNUAL REPORT TO THE MEMBERSHIP

From: Anjan Bose, President

It is my pleasure to provide the 2018 Annual Report to Members of the Washington State Academy of Sciences. It has been a year of planning, progress and stability, and we are steadily increasing our visibility and influence in Washington State.

Where we've been

Staffing and Operations

In FY 2018, our paid staff of approximately 1.5 FTE remained constant—Donna Gerardi Riordan, Executive Director (averaging 0.5 FTE, increasing to 1.0 FTE depending on availability of funds) and Devon Emily Thorsell, Program Coordinator (1.0 FTE). We continue to supplement this skeleton staff with strategic hiring of experienced science writers, other expert consultants, and interns to work on specific projects. One of our immediate goals is to raise enough annual funding to ensure that we can make a full-time commitment to our Executive Director.

Since March 2017, the Academy has been located in an office in Seattle, within WSU Seattle's office suite at 901 5th Avenue. This office has well-equipped meeting space that we are using frequently for Academy related meetings. While we no longer have an office in Olympia, we have strong collegial relationships with WSU and UW government relations staff housed there and have been invited to use their meeting space as needed.

In FY 2018, we finalized two major financial and administrative agreements. First, beginning July 1, 2018 (FY 2019), all of our annual operations allocations from Washington state now flow through WSU rather than being split between WSU and UW. Second, we have negotiated an MOU with WSU to serve as our fiscal administrator of state funds. Having one fiscal administrator rather than two will enable more efficient use of our administrative resources.

Planning Retreat

The WSAS Board and Topical Working Group (TWG) Leadership held their first planning retreat in early February 2018 to discuss the Academy's strategy, direction, and future projects. Attached is the brief overview and summary of those discussions. Since the retreat, the 5-year goals and priority action items have been guiding our work.

Fundraising

At our planning retreat in February, TWG Chair Larry Dalton made a generous offer of a 1:1 matching gift of \$25,000 to WSAS. As of August 24th, we have raised \$20,180 towards that goal.

Website

The Website Committee is chaired by Phil Bernstein, who will rotate off the Board after the annual meeting after completing a six-year term. We would like to thank Phil for his steadfast leadership of the website committee as our site underwent a complete redesign in 2017, with additional tweaks, additions and expansions since then that are now being implemented by staff and a consultant. The site has been developed using WordPress, a web platform that enables easy navigation and updating, as well as real-time modification to accommodate new information and activities. Given the growing importance of the website for real-time communications, the oversight of web content will be folded into the purview of the Communications Committee.

Communications

The Outreach and Communications Committee has changed its name to the Communications Committee. It is chaired by Roger Myers, with active involvement of Board members Don Baer, Shirley Beresford, and Usha Varanasi. Among the new innovations in 2018 are the launching of a quarterly newsletter (the first issue was published in mid-July), more strategic focusing of postings on WSAS's website and in social media, and more actively engaging in activities throughout the state. A summary from the Communications Committee is included elsewhere in the Annual Meeting packet.

Academy Symposia and Reports

The Academy published one document in FY 2018, "Climate Change in Washington State—Research Questions Critical to Preparing for the Future." The 2017 Symposium examined the current state of knowledge regarding climate change effects on the state and provided insight to the uncertainties affecting Washington's natural resources, human well-being, and economy. Hard copies are available at the Annual Meeting; it also can be downloaded from the website, washacad.org.

Topical Working Group Discussions

Topical Working Groups and subgroups originated three new activities in FY 2018. The first, led by John Roll, is the organization of this year's annual symposium, "The Highs and Lows of Conducting Research on Cannabis in Washington State."

The second, led by Dan Schwartz, was an exploration of deep decarbonization with the Washington State Department of Commerce. At an initial meeting in April, participants, including several Members, a representative from the Governor's office, other researchers, and stakeholder groups discussed carbon intensity in various sectors: transportation, the built environment, energy, agriculture, and so on. The group generally agreed that as discussions continued within the state, consideration must be given to how the state can reduce its own carbon footprint without increasing impacts elsewhere in the nation or the globe – that is, contributing to the so-called "leakage" problem. We are now seeking funding to focus a deeper exploration into a single sector, electrification of transportation, to identify the essential information the State needs so that it can develop a deep decarbonization plan that both meets its carbon-reduction goals while also contributing to global decarbonization.

The third activity, co-chaired by Amit Bandyopadhyay and Tony Waas, focused on Additive Manufacturing of Advanced Materials (AMoAM). Recently, Ramulu Mamidala has succeeded Tony Waas, who moved out of state, as co-chair. In early May, we convened a planning meeting of 18 industry, academic, and state leaders to discuss AMoAM for Washington state. The sense of the group is that while some ground-breaking works are underway in the state, little about this potentially transformative arena is widely known by policy makers or by academic and industry peers. Some questions posed by the group included: What can be done to speed up progress in this area in Washington? How can this pursuit be done in a way that allows the state, academia and industry to all benefit? To begin to answer these questions, some themes and next steps emerged from the roundtable presentations and discussions, such as the need for a white paper that lays out the opportunities of AMoAM for state policy makers; discussions about targeted education and workforce development; and discussions about the feasibility of or need for an AMoAM state-wide consortium to facilitate collaboration and sharing of assets among universities, government and industry. An advisory committee is being formed to provide oversight and planning for subsequent activities in this area.

Members who are interested in these topics are encouraged to contact either the Chairs or Co-chairs of the activities, or Donna Gerardi Riordan.

Other Projects and Activities

In October 2017, WSAS sponsored a workshop that convened scientists and engineers, legislators, and those who work to bridge them to discuss how scientists and engineers can help the Washington State Legislature address complex challenges in a rapidly changing world. The workshop addressed legislative needs, mechanisms for integrating scientific and technical information into the policy process, and collaborative proposals developed by participants in the Workshop Proceedings. A significant outcome of the workshop was the establishment by legislators of the first S&T Caucus. Two meetings of the new Caucus were held in the Winter of 2018; we will look for opportunities to involve Members in discussion with the Caucus as issues emerge in the next legislative session.

In the Fall of 2017, the Puget Sound Partnership requested that WSAS review nominees for the PSP's Science Panel. Five members provided an anonymous review of all nominees. The review panel's recommendations were accepted by PSP's Leadership Council. A review of nominations for the Science Panel has become an annual request by PSP.

Also in the Fall of 2017, the Department of Fish and Wildlife requested WSAS to organize an anonymous peer review of a chapter in the agency's update of one of its work products, a chapter on "Riparian Areas of the Columbia Plateau." WSAS coordinated a review conducted by four experts from November 2017-March 2018. (WSAS conducted a review of seven other chapters three years ago.) This final chapter is part of a larger volume that synthesizes scientific information for the purpose of informing the development of policies related to the management of riparian and watershed areas of Washington state.

In the Winter of 2018, the U.S. Forest Service requested the Ruckelshaus Center to conduct a stakeholder assessment consistent with the recommendations of a NASEM report published in December 2017, "A Decision Framework for Managing the Spirit Lake and Toutle River System at Mount St. Helens." WSAS, which initiated the discussions between USFS and the Ruckelshaus Center soon after NASEM released its report, is forming a technical advisory committee for the project. Discussion have begun with WSAS Members and other experts recommended by them.

In the Spring of 2018, the Department of Commerce's Clean Energy Fund asked WSAS to review its draft Notice of Funding Opportunity for \$7.61 Million clean energy projects competition. WSAS invited five individuals to serve as reviewers in May; the NOFO was released in mid-July. Full proposals are due on October 2.

In August 2018, we inaugurated a new speaker series, "An Evening With...", with the goal of engaging Members with leading thought leaders in other sectors in the state. These small gatherings (approx. 16 guests) are another mechanism we are creating to raise WSAS's visibility in Washington. Our first speaker was Howard Frumkin, a Member whose recent research focuses on how our connection to nature may enhance our health.

In addition, WSAS conducted its ninth election during the Spring of 2018, resulting in 16 new members. An additional 13 members were added by virtue of their election to the National Academies of Science, Engineering, and/or Medicine. The 29 new members bring the total number of active WSAS members to 286.

Through all of these projects, we engaged approximately 16% of our Membership in various WSAS activities in FY 2018, not including Symposium participation.

Looking Forward Plans for FY 2019

Moving forward, we will continue to make WSAS the nation's model state academy by working proactively with state elected officials and agency leaders to identify important S&T issues in the state. Our activities will be guided by the 5-year goals and priority actions developed during the planning retreat in February:

- > Develop a clear value proposition
- > Increase WSAS's visibility in the State

- > Increase and stabilize funding
- > Increase staff
- > Inspire and catalyze member engagement

In addition to continuing work through the Topical Working Groups as noted above, we are exploring the following programmatic areas 1) new research to inform monitoring, conservation and restoration in the Salish Sea; 2) scientific and technical inputs to the Governor's Southern Resident Killer Whale Task Force; and 3) invasive burrowing shrimp in Willapa Bay and Grays Harbor. In addition, we are monitoring many other issues that are of emerging interest to state legislators in the upcoming biennium (short-term) and identify other issues with a longer time horizon (long-term).

To support these and other programmatic efforts, we are developing mechanisms to improve our communications, including judicious use of social media, and are continuing to build our network across state agencies, elected officials, universities, and nonprofit organizations. All of these activities, of course, require additional funding, so we are also improving our capacity to raise funds in FY 2019.

As my term as President comes to an end, I ask you to consider how far we've come in the last two years to build our staff and consultants pool to provide the structure to enable effective Member engagement. But, when all is said and done, our work adds value to the state only if our Members are actively engaged. Please join us in our work for Washington state.

2018 WSAS LEADERSHIP RETREAT SUMMARY

The WSAS Board and Topical Working Group Leadership held their first planning retreat in early February 2018 to discuss the Academy's strategy, direction, and future projects. The following is a brief overview and summary of those discussions.

Revised Mission and Vision

Who We Are

The Washington State Academy of Sciences (WSAS) is a not-for-profit organization of 250+ elected members who are nationally recognized for their scientific and technical expertise. All members of the National Academies of Sciences, Engineering and Medicine who reside in Washington state are invited to join; others are elected in recognition of their scientific and technical contributions to our nation and their desire to contribute their expertise to inform issues in Washington State.

Our Mission

WSAS provides expert scientific and engineering assessments to inform public policy making and works to increase the impact of research in Washington State.

Our Value to Washington

WSAS mobilizes the expertise of its members, plus our network of partners, to provide independent, non-advocate scientific and engineering assessments of issues that impact the citizens, government and businesses of Washington state.

Our Structure

WSAS harnesses its members' expertise through topical working groups that allow us to be responsive to requests from stakeholders while also proactively identifying emerging issues of importance to the state. These groups address key issues that affect the future of Washington's natural spaces, built environment, prosperity and well-being of our residents. Topical working groups focus on

- > Environmental quality, sustainability and climate change
- > Jobs, infrastructure and economic environment
- > Quality of life, health, education and workforce development

Our Approach

WSAS accomplishes its mission by drawing on our state-wide pool of distinguished members, state government officials, and other key stakeholders and experts to address critical issues facing Washington state. We organize and conduct multi-disciplinary roundtable discussions, workshops, and symposia to assess risks, identify technological opportunities, and define critical research gaps. Our use of peer review ensures the studies we conduct, programs and projects we evaluate, and reports we provide are scientifically and technically sound and unbiased resources for informing the development of Washington state policy.

5-Year Goals

1. Become the go-to organization in the state for science and engineering expertise (un-biased, non-advocate)
2. Achieve a sustained annual funding level of \$1M/year
3. Expand our network of partnerships and collaborations by leveraging our contacts to increase our impact
4. Increase our staffing to enable rapid and agile response to Washington state needs while establishing a sustained process for proactive identification of key issues facing the state

Priority Action Areas in 2018

The goals above are strongly inter-dependent and all of them must be addressed simultaneously. As noted in the retreat discussion, “We cannot increase our visibility without more member engagement, and we can’t get member engagement without them understanding the value that the WSAS provides both to them and to Washington state policy makers.” To achieve these goals, our priority action items in 2018 are to:

- > Develop a clear value proposition
- > Increase WSAS's visibility in the State
- > Increase and stabilize funding
- > Increase staff
- > Inspire and catalyze member engagement

WSAS will engage in various “levels” of activities ranging from researching critical topics, to holding small roundtables, to conducting workshops and funded consensus studies. This approach creates simpler, less expensive, and more time-efficient ways for WSAS to conduct activities and engage members more easily and in more impactful ways in our activities.

Topical Working Groups

TWG leaders attended the retreat and provided updates to the Board on their potential activities in 2018.

John Roll, Chair – Quality of Life, Health, Education and Workforce Development

John is organizing the 2018 Annual Symposium on the topic of cannabis, which was approved by the Board. Other TWG areas of interest include: the transition of focus in healthcare from communicable diseases to chronic diseases, anti-microbial resistance, opiates, inter-professional education, simulated vs. real clinical experiences for students, air quality and health, green spaces and health, housing and health, market-driven healthcare reform. In the near term, and in addition to organizing the symposium, this TWG will establish a path to a Roundtable or a Workshop on market-driven healthcare reform.

Dan Schwartz, Co-chair – Jobs, Infrastructure, and Economic Environment

Dan reviewed the work of the TWG, including: 1) their initial focus on the VW settlement funds – which after investigation with the State was stopped because there was no role for WSAS; 2) the Clean Energy Fund and deep decarbonization, which is on-going with frequent calls to the leaders in Washington state and a clear role for WSAS; and 3) a member-initiated assessment and planning effort for a Roundtable on advanced manufacturing and materials. Planning meetings for the second and third efforts are scheduled for March and April.

Larry Dalton, Chair – Environmental Quality, Sustainability and Climate Change

Larry described the wide range of issues that this TWG potentially represents, as well as the need for ways to clearly describe the unique impacts that WSAS activities might have on Washington state in order to engage members. After much discussion, members agreed to explore the development of projects in a few areas: a planning session directed at establishing a path forward for an effort (roundtable, workshop or potential funded study) on the impacts of the proposed methanol plant in the Tacoma area; aquaculture in the Puget Sound; and research issues related to the Salish Sea.

Fundraising

During the retreat, TWG Chair Larry Dalton made a generous offer of a 1:1 matching gift of \$25,000 to WSAS. The Board discussed other fundraising strategies, such as:

- > Inviting potential donors, both individuals and foundation representatives, to the Annual Symposium or other WSAS events as they materialize
- > Engaging with the Ruckelshaus Center to understand their fundraising model

- > Establishing a corporate donation policy and actively pursuing corporate donations, plus pursuing corporate matching programs
- > Establishing a fundraising advisory group to advise the Board that includes stakeholders and non-members
- > Securing professional assistance to fundraise
- > Identifying philanthropic and foundation prospects for Board members and Donna Riordan, Executive Director, to contact
- > Reaching out to other stakeholder groups: tribes, legislators, donors, Executive branch representatives, and representatives of the technology sector

Board Demographics

The Board discussed increasing its diversity in geographic region (north, south east and west), affiliation (other universities, organizations, and industry), Academy section, gender and race. Members were also interested in defining clearer roles and responsibilities (especially for non-Executive Committee roles) and more deliberate orientation for new Board members.

2018 Membership

The Board discussed the need for members who, in addition to being highly qualified experts in their disciplines, will contribute to the mission and vision of WSAS, particularly through their participation in the organization. In addition, it was noted that policy issues needing input from the social sciences are of great interest to the state.

There also was discussion about the need to improve the on-boarding of new members to help them understand how to engage in WSAS activities. A "New Member Orientation" was created, and includes a brief discussion of the mission, value, structure and approach of WSAS, ways to get to know their legislators, how to get involved in WSAS, etc. among others.

TREASURER'S ANNUAL REPORT TO THE MEMBERSHIP

From: Cathryn Booth-LaForce, Treasurer

Finance Committee: The finance committee is chaired by Treasurer Cathryn Booth-LaForce; committee members are Tom Marsh and Michael Smerdon. If you are interested in joining the Finance Committee, please contact the chair.

Funding Sources: The Academy receives funding from several sources: an annual appropriation from Washington State, state agency commissions for specific projects, corporate donations (primarily to support students to attend the annual AJAS/AAAS meeting), and private donations. Total revenue in FY 2018 was \$317,070.49; total expenses in FY 2018 were \$284,892.42. Net assets are \$131,648.80 as of June 30, 2018.

State Funding: The Academy's fiscal year begins on July 1 and ends on June 30. In FY 2018, the legislature appropriated \$157,546 for WSAS's operations. As of mid-FY 2018, all state funds are now housed at WSU, with whom we now have a Memorandum of Agreement to serve as fiscal agent. State funds are allocated for staff salaries, office leasing, board and staff travel, consultants, allowable expenses for board meetings and the annual meeting, and other expenses associated with Academy operations. Revenue from additional commissioned work of the Academy is deposited either at WSU or in our private business account.

Member Gifts and Donations: The Annual Appeal to the membership and other donors in FY 2018 resulted in donations of \$46,475.72, an increase of over 450% from FY 2017. In February of 2018, WSAS member and TWG chair Larry Dalton generously initiated a \$25,000 match campaign to support increased Academy efforts to pursue our mission with the state. As of August 22, we have raised \$20,180 towards the Dalton Challenge.

Investments: WSAS has three investment accounts with Vanguard. Together these accounts amount to \$49,012.16 as of June 30, 2018. In FY 18, our investment accounts increased 13.7% without additional deposits.

- > Vanguard Dividend Growth Fund: \$10,000.00 was invested in May 2013; the balance is \$16,813.04 as of June 30, 2018.
- > Vanguard Small-Cap Index Fund: \$11,229.42 was invested in December 2014; the balance is \$16,207.68 as of June 30, 2018.
- > Vanguard 500 Index Fund: \$11,229.41 was invested in December 2014; the balance is \$15,991.44 as of June 30, 2018.

Annual Meeting Expenses: Expenses at the annual meeting such as space and equipment rental, speaker travel, contracting, and supplies are paid from the state appropriation. Annual meeting registration fees are deposited into WSAS's business checking account at WSECU and used to cover catering expenses.

Support for K-12 Activities: The Academy received support for the attendance of students to the Annual Symposium and for their participation in the 2018 American Junior Academy of Sciences (AJAS) conference in Austin, TX in February 2018. Funding totaling \$7,250 was received from Boeing and individual donors.

Reporting: As a 501(c)(3) organization, the Academy must report all sources of income and expenditures annually to the state and to the IRS. Our 990 reports for are available upon request.

LEADERSHIP AND GOVERNANCE: COMMITTEES

Board of Directors

WSAS is governed by a Board of Directors composed of five officers and twelve members. Terms begin and end at the end of the annual meeting in September.

2017-18 Officers

Position	Name	Affiliation	End of Term
President	Anjan Bose	WSU	2018
President Elect	Ron Thom	PNNL (retired)	2018
Past President	Allan Konopka	Purdue Univ (retired)	2018
Treasurer	Cathryn Booth-LaForce	UW	2020
Secretary	Don Baer	PNNL (retired)	2019

2017-18 Board of Directors

Name	Affiliation	End of Term
Shirley Beresford	UW	2020
Phil Bernstein	Microsoft Research	2018
Richard Catalano	UW	2019
Sue Clark	PNNL/WSU	2020
Cynthia Dougherty	UW	2020
Dave Eaton	UW	2018
Tom Marsh	WSU	2019
Roger Myers	Aerojet Rocketdyne (retired)	2019
Pinky Nelson	WWU (retired)	2019
Michael Smerdon	WSU	2018
Usha Varanasi	UW	2019
Jud Virden	PNNL	2020

In the 2018 WSAS elections, the following slate of officers and board members were elected:

Treasurer – Cathryn Booth-LaForce, re-elected for a second term

Board Member – Dianne Chong, elected for first term

Board Member – John Roll, elected for first term

Board Member – Michael Smerdon, re-elected for a second term

2018-19 Officers

Position	Name	Affiliation	End of Term
President	Ron Thom	PNNL (retired)	2021
President Elect	<i>vacant</i>	To be elected Summer 2019	
Past President	Anjan Bose	WSU	2019
Treasurer	Cathryn Booth-LaForce	UW	2020
Secretary	Don Baer	PNNL (retired)	2019

2018-19 Board of Directors

Name	Affiliation	End of Term
Shirley Beresford	UW	2020
Richard Catalano	UW	2019
Dianne Chong	Boeing (retired)	2021
Sue Clark	PNNL/WSU	2020
Cynthia Dougherty	UW	2020
Tom Marsh	WSU	2019
Roger Myers	Aerojet Rocketdyne (retired)	2019
Pinky Nelson	WWU (retired)	2019
John Roll	WSU	2021
Michael Smerdon	WSU	2021
Usha Varanasi	UW	2019
Jud Virden	PNNL	2020

2018-19 Standing Committees

Executive Committee

Ron Thom, chair

Anjan Bose
Cathryn Booth-LaForce
Don Baer
Donna Gerardi Riordan, *ex officio*

Membership Committee

Jud Virden, chair, section 2

Don Baer, vice chair
Kerry Hipps, section 1
Ray Hilborn, section 3
Margaret Heitkemper, section 4
Ron Mittelhammer, section 5
Anjan Bose, at-large
Usha Varanasi, at-large
Don Dillman, at-large
Jim De Yoreo, at-large

Finance Committee

Cathryn Booth-LaForce, chair

Tom Marsh
Michael Smerdon

Communications Committee, *ad hoc*

Roger Myers, chair

Don Baer
Shirley Beresford
Usha Varanasi

Nominations Committee

Anjan Bose, chair (beginning Sept. 2018)

Study Oversight Committee

Ron Thom, chair

Topical Working Groups

Environmental Quality, Sustainability and Climate Change, TWG 1

Larry Dalton, chair

Jim Fredrickson, vice chair

Jobs, Infrastructure and Economic Development, TWG 2

Dan Schwartz, co-chair

Jun Liu, co-chair

Quality of Life, Health, Education and Workforce Development, TWG 3

John Roll, chair

Guy Palmer, vice chair

MEMBERSHIP COMMITTEE'S 2018 ANNUAL REPORT TO THE MEMBERSHIP

From: Dave Eaton, Chair and Jud Virden, Vice Chair, Membership Committee

WSAS conducted its ninth election during the Spring of 2018, resulting in 16 new members. An additional 13 members were added by virtue of their election to the National Academies of Science, Engineering, and/or Medicine. The 29 new members bring the total number of active WSAS members to 286. The table below shows the distribution of all WSAS nominations by section between 2013 and 2018.

Section	Membership	Nominations by year (last 5 years)					
		2013	2014	2015	2016	2017	2018
1	58	9	5	5	6	5	12
2	76	7	4	10	10	8	8
3	58	1	5	9	9	3	9
4	75	5	2	7	8	5	6
5	33	2	3	4	4	2	3
Total	300	24	37	35	31	23	38

Nominations

WSAS procedures specify that a Membership Committee be comprised of a chair and vice chair, along with the five chairs of the membership section committees, and five at-large members who oversee the annual election of new members. Procedures also specify that each section have a 3-5-person membership committee with a chair and vice chair. The composition of these committees for 2018 is listed below.

Membership Committee

Dave Eaton, chair	Ron Mittelhammer, section 5
Jud Virden, vice-chair, section 2	Anjan Bose, at-large
Kerry Higgs, section 1	Usha Varanasi, at-large
Ray Hilborn, section 3	Don Dillman, at-large
Margaret Heitkemper, section 4	Jim De Yoreo, at-large

Section Committees

1 – Physical and Mathematical Sciences

Kerry Higgs, Don Baer, Charlie Campbell, Bradley Colman

2 – Engineering and Technology

Jud Virden, Radia Perlman, Susmita Bose, Tony Waas

3 – Biological Sciences

Ray Hilborn, Jim Fredrickson, John Reganold, Robin Waples, Patricia Hunt

4 – Health Sciences

Margaret Heitkemper, Maxine Hayes, John Roll, George Martin

5 – Social and Behavioral Sciences

Ron Mittelhammer, Andrew Meltzoff, Robert Plotnick, Beti Thompson, Tom Marsh

Elected directly by the membership

Section 1 - Physical and Mathematical Sciences

R. Morris Bullock

Laboratory Fellow, Director, Center for Molecular Electrocatalysis, Pacific Northwest National Laboratory

Dr. Bullock is internationally recognized for his contributions to fundamental research in the design of molecular electrocatalysts and the reactivity of transition metal hydride complexes, which are key intermediates in many industrially important catalytic reactions. As Director of the Center for Molecular Electrocatalysis, an Energy Frontier Research Center, his team developed the fastest molecular electrocatalyst for the production of hydrogen.

David S. Ginger, Jr.

Alvin L. and Verla R. Kwiram Professor of Chemistry, University of Washington

Dr. Ginger has pioneered the application of scanning probe and multimodal microscopy to study the optoelectronic properties of thin film semiconductor materials including organic semiconductors, quantum dots, and halide perovskites. He has helped elucidate the role of surface chemistry in passivating both thin film and colloidal perovskite and II-VI semiconductor surfaces. These methods are utilized worldwide by groups studying organic, perovskite, plasmonic, and quantum-dot based materials.

Sotiris S. Xantheas

Laboratory Fellow, Pacific Northwest National Laboratory, Affiliate Professor of Chemistry, UW-PNNL Distinguished Faculty Fellow

Dr. Xantheas is renowned for his physical chemistry research involving the nature of intermolecular interactions in aqueous clusters and liquid water/ice. In addition to the impact of his research, Xantheas has served the scientific community through participation in Department of Energy and National Science Foundation workshops and advisory committees, where he has focused on computation's role in addressing topics such as advanced materials, catalysis, and carbon management.

Section 2– Engineering and Technology

Michael B. Bragg

Frank & Julie Jungers Dean of Engineering, Professor of Aeronautics and Astronautics, College of Engineering, University of Washington

Dr. Bragg's primary areas of research are aircraft icing and unsteady aerodynamics. He has directed millions of dollars in externally funded research from NASA, FAA, DoD and several aerospace companies. This includes the U.S.-France international collaboration on aircraft icing aerodynamics and an extensive industry-funded research program addressing engine installation for low-boom supersonic aircraft. Much of this research has been conducted in university wind tunnel facilities as well as those at NASA in the U.S. and ONERA in France. Dr. Bragg is internationally known in the area of aircraft icing.

Section 2– Engineering and Technology *(continued)*

Yuehe Lin

Professor, Washington State University, Laboratory Fellow, Pacific Northwest National Laboratory

Dr. Lin is recognized for his leadership and contributions to the fields of bioengineering and biomedical nanotechnology. He has done a lot of pioneered work in the development of nanomaterials, BioMEMS and nanobioelectronic devices for disease diagnosis and drug delivery. His work shows a high level of creativity and novelty, which has resulted in over 20 patents. Over half of them have been licensed to industrial partners for commercialization, resulting in three key contribution awards from PNNL.

Suzie H. Pun

Professor of Bioengineering, University of Washington

Dr. Pun's research work in biomaterials has resulted in 11 issued patents and over 115 peer-reviewed manuscripts. She is one of the co-inventors of a polymer delivery system that was the first targeted siRNA delivery system tested in human clinical trials and also used in several Phase I/Phase II human clinical trials anti-cancer drug delivery. Since arriving at the UW, she has developed materials for applications in cancer therapy, neurodegenerative disease, trauma treatment and kidney disease.

Gary Yang

Founder and CEO, UniEnergy Technologies

Dr. Yang is a pioneer and world recognized leader in clean energy. He led the energy storage program for DOE and his effort has a profound impact in the world. He led the development of new redox flow batteries which increased the energy density by two times and increased the operation temperature range by 50%. This breakthrough technology was scaled up and commercialized by UniEnergy Technologies (UET), a Washington State company in Mukilteo. Dr. Yang founded and led the company, which employs over 60 scientists and engineers; the company's product is deployed over the world with over \$100M sales.

Section 3 – Biological Sciences

John A. Browse

Professor of Biochemistry and Plant Sciences, Washington State University

Dr. Browse has made sustained and ground-breaking discoveries over the course of his 40 years as a plant lipid biochemist. He is internationally recognized for developing creative approaches to identify and characterize genes that control the biosynthesis of membrane and storage lipids. Collaborative work with industrial partners has produced plants with altered membrane compositions or improved vegetable oils. He is credited with elucidating the mechanism of action of the fatty acid-derived hormone jasmonate and establishing the hormone's function in plant immunity and reproduction. Browse's scientific accomplishments continue to have enduring impact on many fundamental and applied areas of plant science.

Daniel Schindler

Professor, School of Aquatic and Fishery Sciences, University of Washington

Dr. Schindler's research has changed the way ecologists think of the meta-population concept, particularly with respect to Pacific salmon and its implications for sustainability. His research has contributed substantially to understanding linkages between salmon population ecology and demography, and natural as well as anthropogenic impacts. His research has highlighted the impact that Pacific salmon have on terrestrial as well as marine ecosystems. Dr. Schindler's ecosystem approach has improved understanding how aquatic systems behave and react to factors including changing climate, recovery from eutrophication, and changes to food web structure, with studies in diverse environments including Alaska, and Washington State, including Lake Washington.

Section 3 – Biological Sciences *(continued)*

James R. Winton

Senior Scientist, Emeritus, U.S. Geological Survey, Western Fisheries Research Center

At USGS, Dr. Winton headed a team consisting of more than 25 scientists, technicians, post-doctoral researchers, graduate students and visiting scientists working on infectious diseases of finfish. The team conducts research using many of the newest techniques in molecular biology to improve the detection of fish pathogens, determine critical factors in epidemiology and ecology of fish diseases, and develop novel control strategies for reducing losses among populations of hatchery-reared and wild fish. He is highly regarded nationally and internationally regarding treatment and management of aquatic diseases.

Section 4 – Health Sciences

Dimitri A. Christakis

George Adkins Professor of Pediatrics, University of Washington

Dr. Christakis is an international leader in how early experiences affect children's cognitive, social, and emotional development. He has authored over 200 peer-reviewed publications including seminal ones related to the effects of early exposure to media and children's cognitive development. His research led to Disney removing unsubstantiated educational claims related to their Baby Einstein products and subsequently to a national buyback program. Recently, he completed the largest community-based experimental trial to demonstrate that reducing exposure to violence on screen decreases real world aggression.

Hilaire J. Thompson

Joanne Montgomery Endowed Professor, Biobehavioral Nursing and Health Informatics, University of Washington

Dr. Thompson's area of research focuses on developing knowledge and implementing evidence-based practice related to prevention, treatment and rehabilitation of persons with traumatic brain injury (TBI), with a focus on older adults. Her funded work has documented a lower intensity of care provided to older adults, as well as factors that influence health services utilization and costs of care in this population. These have influenced policy related to care of the growing numbers of people with TBI in our rapidly aging population. Her leadership in the field of TBI has been recognized by appointments to national panels, and elected fellowships.

Hans P.A. Van Dongen

Professor of Medicine; Director, Sleep and Performance Research Center, Washington State University, Elson S. Floyd College of Medicine

Dr. Van Dongen demonstrated that individual differences in vulnerability to sleep loss are a robust human trait. He showed that it has two distinct phenotypes: one dependent on vigilant attention, associated with neuronal networks exhibiting local sleep, and predicted by TNF genotype; the other dependent on cognitive flexibility, associated with top-down attentional networks, and predicted by dopaminergic genotypes. He captured the temporal dynamics of vulnerability to sleep loss in biomathematical models that are in use to predict cognitive impairment and safety in shift work operations. He recently revealed the neurobiological underpinnings of metabolic disorders in shift workers.

Section 5 – Social and Behavioral Sciences

J. David Hawkins

Professor Emeritus, University of Washington

Dr. Hawkins research focuses on understanding and preventing child and adolescent behavioral health problems. He pioneered the identification of risk and protective factors for these problems across multiple structural and socialization domains and developing and trialing preventive interventions targeted at these predictors. He contributed to the emergence of prevention science through the development and testing of theory (the social-development model), etiological research on predictors of behavioral health problems, and the creation and rigorous testing of community, school, and family-focused preventive interventions.

Timothy Alan Kohler

Regents Professor, Dept. of Anthropology, Washington State University

Dr. Kohler pioneered development and use of agent-based modeling for understanding settlement and subsistence in the pre-Hispanic U.S. Southwest. For his computational approaches to decoding large-scale patterning in prehistoric societies, he is the only scholar ever awarded both the Alfred Vincent Kidder Award for Eminence in American Archaeology (American Anthropological Association) and the Society for American Archaeology's Award for Excellence in Archaeological Analysis.

Brian E. Saelens

Professor of Pediatrics and of Psychiatry and Behavioral Sciences, University of Washington

Dr. Saelens' research interests include pediatric obesity treatment and prevention. His work examines strategies to improve the efficacy and reach of family-based weight management interventions for youth with already elevated weight status. He also explores how environmental factors and policies influence physical activity and eating behaviors in children and adults. He collaborates with community partners and local public health practitioners to help implement policy, systems, and environment change around healthy eating and active living. Dr. Saelens has used the natural experiments of light rail and bus rapid transit here in our community to understand how these changes in transportation affect people's physical activity and overall health.

Elected by virtue of induction to the National Academy of Sciences, Engineering, and/or Medicine in 2017-18.

Section 2 – Engineering and Technology

Xiangli Chen

McKinsey; NAE

Dr. Chen worked at General Electric (GE) for 19 years and held positions such as Vice President at GE and Chief Technology Officer and President of GE China, leading the business team in research, new product development, and engineering services. Chen received the Magnolia Gold Award from the Municipal Government of Shanghai in recognition of his contributions to the city's social and economic development. He now uses his expertise in Research and Development as a Senior Advisor at McKinsey and Company. Dr. Chen was elected to NAE in 2017 for pioneering work in optical sensing and precision laser processing, and for leadership in globalizing industrial research and development.

Section 2 – Engineering and Technology *(continued)*

David B. Lomet

Microsoft Research; NAE

Dr. Lomet has been a principal researcher managing the Microsoft Research Database Group at Microsoft Research since 1995 focusing on research and product development in architecture, programming languages, and distributed systems. His primary interest is database systems, focusing on access methods, concurrency control, and recovery and he has served on a number of program committees including the Association for Computing Machinery's Special Interest Group on Management of Data, Portable on Demand Storage, VLDB, and ICDE. Dr. Lomet was elected to NAE in 2018 by virtue of his contributions to high-performance database systems.

Offered membership by virtue of induction to the National Academy of Sciences, Engineering, and/or Medicine in years previous to 2017.

Section 2 – Engineering and Technology

William A. Anders

Founder, Heritage Flight Museum, former Chairman and CEO, General Dynamics, and former NASA Astronaut; NAE

Mr. Anders was selected by NASA in 1963 as an astronaut where he focused his expertise on dosimetry, radiation effects, and environmental controls and was the lunar module pilot for the first lunar orbit mission, logging in more than 6000 hours flying time over his career. He has served the scientific community through participation in the National Aeronautics and Space Council, Atomic Energy Commission, and became the first Chairman of the Nuclear Regulatory Commission responsible for nuclear safety and environmental compatibility. Mr. Anders was elected to NAE in 1984 by virtue of his contributions to nuclear engineering, space exploration and research, and the development of national nuclear, aeronautical, and space policy.

Section 3 – Biological Sciences

Michael J. Bevan

Professor Emeritus, University of Washington; NAS

Dr. Bevan joined the University of Washington in 1990 as a Professor of Immunology and Howard Hughes Medical Institute Investigator. He was among the first to describe the phenomenon of MHC-restricted antigen recognition by T lymphocytes, has been a driving force in the elucidation of mechanisms underlying T cell receptor repertoire selection in the thymus and periphery, and was the first to report cross-priming. Dr. Bevan was elected to NAS in 2008 for his contributions to the field of immunology.

Benjamin Hall

Professor Emeritus, University of Washington; NAS

During his 44 years in genetics and biology at the University of Washington, Dr. Hall focused on transcription mechanisms in *S. cerevisiae* which culminated in the patented invention "Expression of Polypeptides in Yeast". This patent has now been licensed for the production of vaccines against Hepatitis B virus, Human Papilloma Virus (HPV), as well as Human Insulin and other recombinant proteins. Dr. Hall was elected to NAS in 2014 for his research on molecular systematics of fungi and of flowering plants, initially using the sequences of moderately conserved proteins of the transcription apparatus as an evolutionary metric.

Section 3 – Biological Sciences *(continued)*

Lynn M. Riddiford

Professor Emerita, University of Washington; NAS

Dr. Riddiford joined the University of Washington in 1979 and her research focused on developmental challenges of metamorphosis and how hormones orchestrate the underlying cellular and molecular events. Her research investigated the control of molting and metamorphosis in insects by the steroid hormone ecdysone and the sesquiterpenoid juvenile hormone. Dr. Riddiford was elected to NAS in 2010 for significant contributions to the field of developmental biology.

Section 4 – Health Sciences

Linda B. Buck

Fred Hutchinson Cancer Research Center; NAS

Dr. Buck was elected to NAS in 2003 for her research investigating the mechanisms that underlie perception. Buck's laboratory studies the molecular mechanisms and neural circuits that underlie the sense of smell and instinctive odor responses. She is interested in how the olfactory system detects myriad environmental chemicals and how the brain translates those chemicals into odor perceptions, hormonal alterations, and instinctive behaviors. Her research into neural circuits underpinning these effects may provide clues to those affected in certain human disorders, particularly those involving stress, fear, and appetite. In 2004, she was a recipient of the Nobel Prize in Physiology or Medicine for her discovery of odorant receptors and the organization of the olfactory system.

Steve Henikoff

Fred Hutchinson Cancer Research Center; NAS

Dr. Henikoff is a member of the Division of Basic Sciences at Fred Hutchinson Cancer Research Center, and an investigator with the Howard Hughes Medical Institute. He performs research on chromatin dynamics, transcriptional regulation, and centromere maintenance and develops experimental and computational tools for studying these processes. Dr. Henikoff was elected to NAS in 2005 for his contributions to biotechnology tools such as techniques for deciphering the function of protein sequences by using the power of computers.

Eric Holland

Fred Hutchinson Cancer Research Center; NAM

Dr. Holland's expertise in neurosurgery and molecular biology has contributed to the understanding of the molecular basis of brain tumors and he has develop new approaches to their treatment. He is the Senior Vice President and Director of the Human Biology Division at Fred Hutchinson Cancer Research Center, where he is also the director of Solid Tumor Translational Research, which targets all solid tumors and spans multiple divisions and disciplines. Dr. Holland was elected to NAM in 2009 for his research studying the biology of gliomas using genetically accurate mouse models, the way that they respond to current therapy, and the development of new methods for treating them.

Daniel R. Masys

Affiliate Professor, University of Washington; NAM

Dr. Masys was elected to NAM in 2001 for his research on the development of informatics infrastructure for conducting clinical and translational research, and genome-phenome correlation using phenotype data derived from electronic medical records data. He has previously served as Chief of the International Cancer Research Data Bank of the National Cancer Institute and was also Director of the Lister Hill National Center for Biomedical Communications, which is a computer research and development division of the National Library of Medicine.

Section 4 – Health Sciences *(continued)*

Carver A. Mead *(has elected to transition immediately to Emeritus status; not included in new active member numbers)*

Gordon and Betty Moore Professor Emeritus of Engineering and Applied Science, California Institute of Technology; NAE, NAS

Dr. Mead was elected to NAE in 1984 and NAS in 1989 for his contributions to the development and design of semiconductors, digital chips, and silicon compilers, which revolutionized the semiconductor industry with very-large-integrated circuits. Mead has been involved in the founding of over 20 companies and in 2002, he received the National Medal of Technology from President Bush. Dr Mead is a leader in neuromorphic electronic systems, as much of his work builds off of the principle of modeling systems according to the functions of the human nervous system.

Jane E. Sisk

Affiliate Professor, University of Washington; NAM

Dr. Sisk was elected to NAM in 2001 for her contributions to understanding interventions to improve the quality of health care for and to reduce disparities among certain subgroups. Dr. Sisk has contributed to the scientific community by serving on a number of committees such as the National Cancer Policy Board, Committees to Study Issues and Priorities for New Vaccine Development, Evaluating Telemedicine: Clinical, Economic, and Policy Issues, Advice the National Library of Medicine on Information Center Services, and the committee on Quality Measures for the Healthy People Leading Healthy Indicators.

George J. Todaro

Targeted Growth, Inc.; NAS

While at the National Institutes of Health, Dr. Todaro co-authored the groundbreaking “Oncogene Theory” that became one of the foundations for cancer research. Dr. Todaro was elected to NAS in 1986 for his work in the field of medical genetics and was the co-formulator of the oncogene hypothesis. As the CEO of Targeted Growth, Todaro is currently working to increase crop yields in both laboratory and field crops through genetic engineering and targeting specific promoters in crops.

Section 5 – Social and Behavioral Sciences

Michael F. Goodchild

Professor Emeritus, University of California at Santa Barbara; NAS

Dr. Goodchild is recognized as the leading academic GIS practitioner in the world. He has been awarded four honorary doctorates, serves on the editorial boards of ten journals, has published 15 books and over 400 articles. Dr. Goodchild was elected to NAS in 2002 for his research contributions to the understanding of geographic information and fundamental problems of measurement, description, and analysis of phenomena on the surface of Earth. He has also contributed to the scientific community through his services such as acting as Chair of the National Research Council’s Mapping Science Committee, and the Advisory Committee on Social, Behavior, and Economic Sciences of the National Science Foundation.

COMMUNICATIONS COMMITTEE 2018 REPORT TO THE MEMBERSHIP

From: Roger Myers (Chair), Don Baer, Shirley Beresford, Usha Varanasi

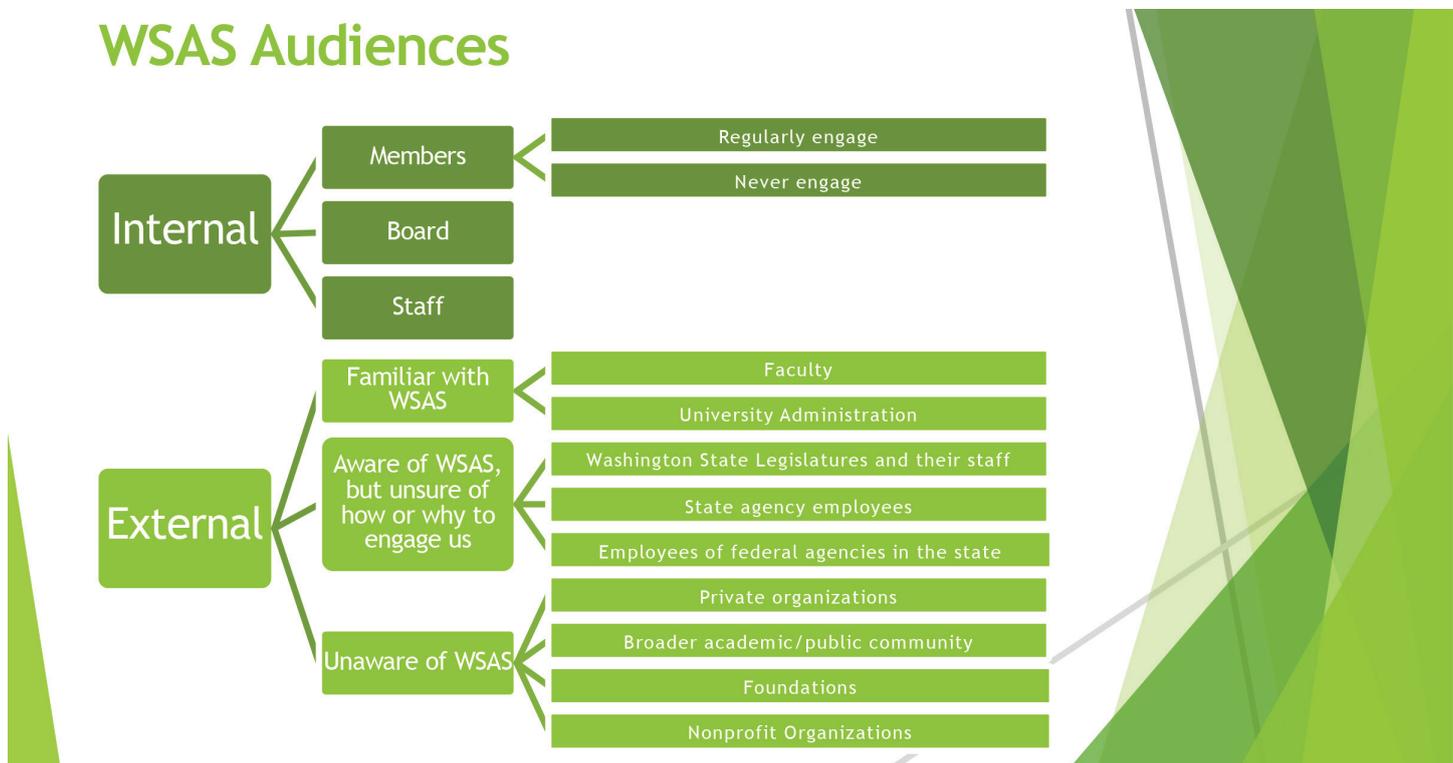
The Outreach Committee was renamed the Communications Committee at the May 2018 Board meeting. The Committee’s work is being guided by the new WSAS Communications objectives developed at the February 2018 planning retreat:

- > Enhance understanding of the WSAS mission and how it can serve Washington State
- > Increase WSAS member engagement in WSAS activities
- > Increase the external visibility of the WSAS
- > Support fundraising activities by highlighting WSAS’s impact
- > Recognize achievements of scientists in Washington State

The **long-term measure of success** of our efforts will be measured by the number of state-level issues for which WSAS is invited to provide scientific and engineering expertise in support of good policy.

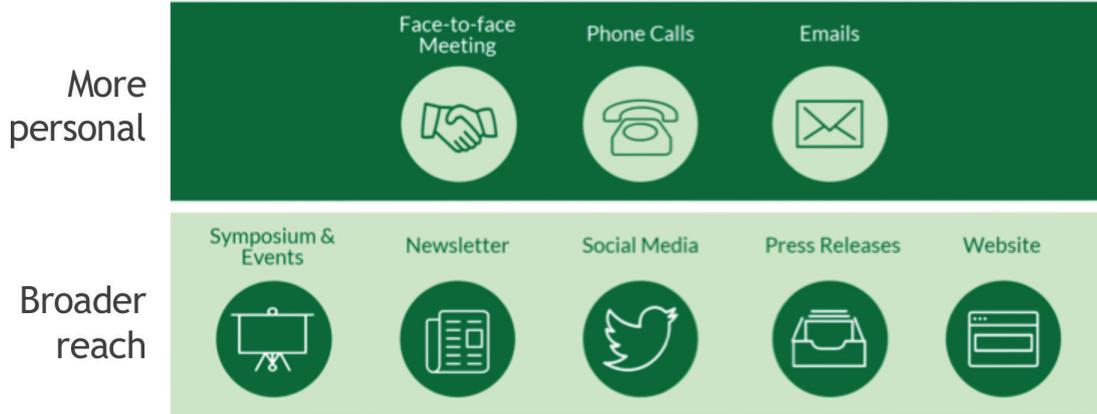
A key challenge for WSAS communications is the diversity of our audiences, including both internal and external stakeholders. This challenge is summarized in the figure below, which highlights the need for a variety of communications channels.

WSAS Audiences



To reach our audiences WSAS must have a range of communication channels – ranging from the more personal to broad reach as shown in the figure below. The Communications Committee is focused on the broader reach channels and received approval to issue a Quarterly WSAS Newsletter at the May Board meeting.

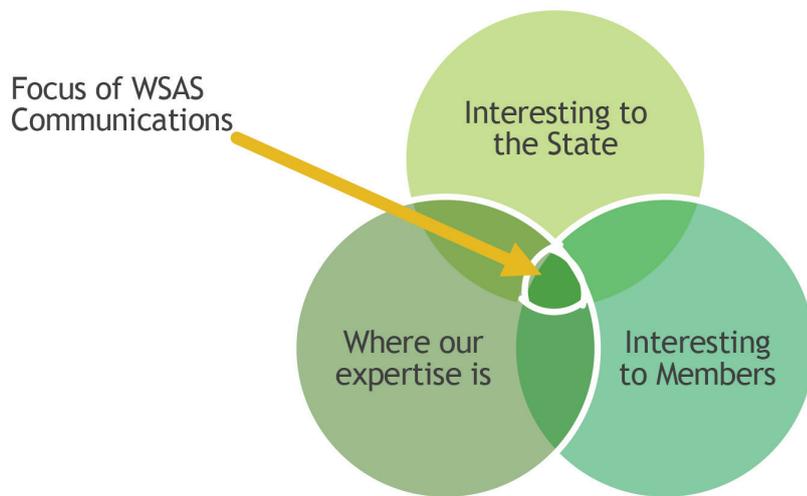
WSAS Communication Channels



Effective communications utilize a mix of channels

As the Communications Committee works on its communications, starting with the newsletter, we work to find topics that meet three key criteria: they must be of interest to our members, they must be of interest to the state, and they must be topics where the WSAS has expertise. This is summarized in the figure below.

Approach to Communications Content

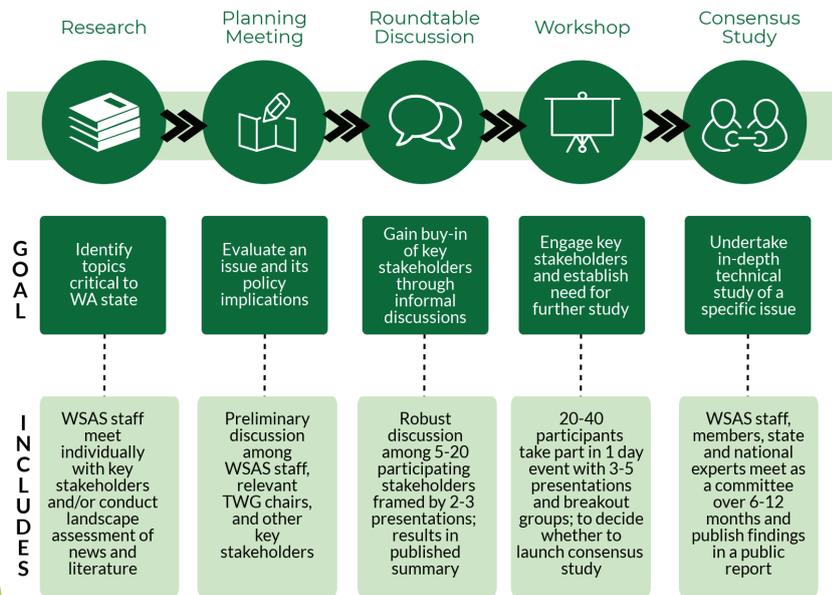


Goal is to hit the overlap in the Venn diagram, while recognizing that we have a diverse audience!

To increase member engagement in WSAS activities it is critical that members be apprised regularly of what those activities are. Our communications will regularly highlight WSAS topic assessments using the WSAS Value Chain summarized below. With this multi-tier approach to topic assessment we can enable WSAS members to engage in activities at a level commensurate with their availability, while engaging state government representatives to show the value that WSAS brings to topic assessments.

WSAS Activities Demonstrate Our Value

WSAS Value Chain



Members are encouraged to participate in these activities!

Examples of these activities from the past year are summarized in the figure below. Last October WSAS co-sponsored a Science and Technology Workshop with members of the state legislature. We have held two Roundtable Discussions so far this year, one on Deep Decarbonization and one on Additive Manufacturing of Advanced Materials. Both of these roundtables were attended by representatives from multiple universities, industry, and state government agencies. Finally, we have held several meetings with state agencies to discuss ways that WSAS could assist their efforts with technical assessments of key issues facing the state.

Increasing WSAS Visibility

Science & Technology Workshop



Meetings with State Agencies



Roundtable Discussions

- ▶ Implications of WA state goals to reduce its carbon footprint
- ▶ Additive manufacturing of advanced materials in WA State

Our first Quarterly Newsletter was issued in July 2018. All members of the communications committee author or co-author sections of the newsletter. The first issue was quite successful, with 133 WSAS members (~46%) opening the email and 36 members (12%) clicking on at least one link in the newsletter. We also know that some board members forwarded the newsletters to non-members, which is a great way to increase awareness of WSAS. We encourage other members to do the same. Planning for our next Newsletter is proceeding with an expected release date in late October. We will continue to report on readership statistics.

Increasing Member Engagement

WSAS Member Newsletter

Goals:

- ▶ **Inform members** of WSAS's ongoing efforts and initiatives.
- ▶ **Invite members to get involved** in areas they are passionate about or can contribute their expertise.
- ▶ **Demonstrate value of WSAS** to members. Show membership how WSAS is working to achieve its mission.
- ▶ Share relevant info and events
- ▶ **Recognize member achievements** and celebrate WSAS accomplishments.
- ▶ **Build a sense of community** among WSAS members.



Finally, the Communications Committee is developing a Strategic Communication Plan for WSAS that will provide guidance to this and future committees and WSAS Staff members on the goals, audiences, and approaches for WSAS Communications. A draft plan is being reviewed by the Board of Directors and should be approved at the next BoD meeting.

We invite interested members who wish to help WSAS achieve the goals listed at the beginning of this summary to contact any member of the Communications Committee or WSAS staff and let us know!

11TH ANNUAL MEETING & SYMPOSIUM

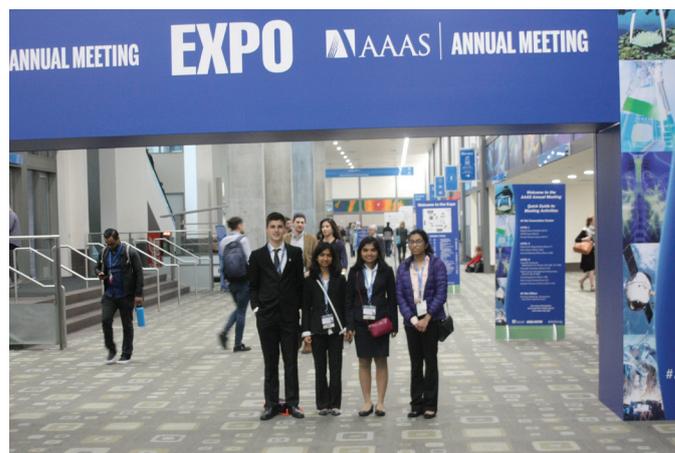
WASHINGTON STATE
Academy of Sciences
September 13, 2018 | Museum of Flight, Seattle, WA

AAAS-AJAS CONFERENCE 2018 TRIP REPORT

Prepared by Gary Foss

March 27, 2018

WSAS Program Coordinator Devon Emily Thorsell and I accompanied our four selected students to the meeting of the American Junior Academy of Sciences (AJAS), held in conjunction with the 184th meeting of the American Association for the Advancement of Science (AAAS), Feb 14-19, Austin TX. 156 high school students from 22 states were in attendance. Our students were Neha Hulkund, Sagarika Samavedi, Eshika Saxena, and Sean Weber.



AJAS is America's only research honor society for high school scientists. Each affiliated state's Academy of Science selects the premier high school researchers from their state to be lifetime fellows in AJAS, inducted and honored at a yearly conference.

The AJAS mission is to introduce, encourage and accelerate pre-college students into the world of science, engineering and technology by enabling their participation in the social, cultural and scientific activities of the annual meeting of the AAAS. It does this primarily through science activities that allow students to experience the world of scientific research first hand.

We arrived late Wednesday evening. On Thursday we signed up for tours at the University of Texas, Austin. Hosts were the Offices of President, Vice President and Provost, the College of Natural Sciences, the Cockrell School of Engineering, the Jackson School of Geoscience, Dell Medical School, and the Texas Advanced Computing Center.

Our group's morning tours started with presentations from 3 top young researchers:

Dr. Andrea Thomaz, Associate Professor of Electrical and Computer Engineering, co-Founder and CEO of Diligent Robotics Inc.

Dr. Michael Webber, Professor of Mechanical Engineering, Deputy Director of the Energy Institute, Co-Director of the Clean Energy Incubator, and Josey Centennial Professor in Energy Resources.

Dr. Moriba Jah, Associate Professor of Aerospace Engineering. Prior to joining UT Austin, Dr. Jah was the Director of the University of Arizona's Space Object Behavioral Sciences. Preceding that, he was the lead for the Air Force Research Laboratory's Advanced Sciences and Technology Research Institute for Astronautics (ASTRIA).

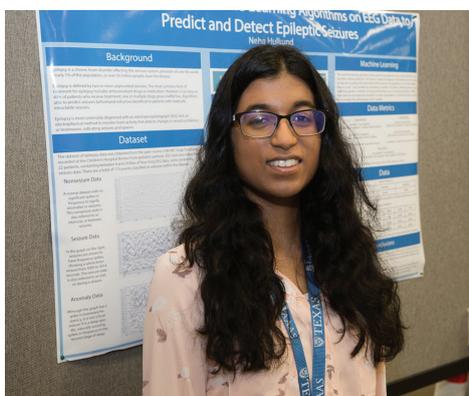
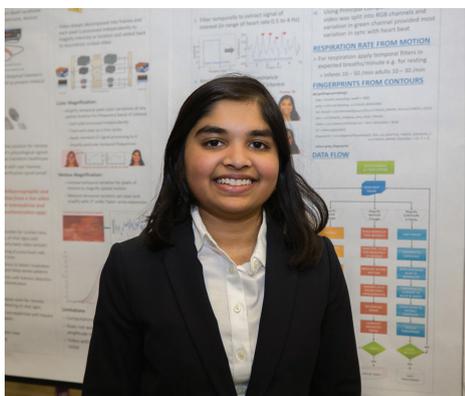
In the afternoon, students could select from tours of the Core Research Center, the Center for Electromechanics, the Ferguson Structural Engineering Laboratory, The Jackson Museum of Earth History, the Microelectronics Research Center, the Advanced Computing Center, and the Archeology Research Lab.



On Thursday evening, we attended the AAAS President’s address. Dr. Susan Hockfield is a distinguished professor of neuroscience, former Yale Provost, and 16th President of MIT. She recognized the new AJAS fellows and welcomed them to the scientific community. The students were then invited to the President’s reception for food and fellowship.

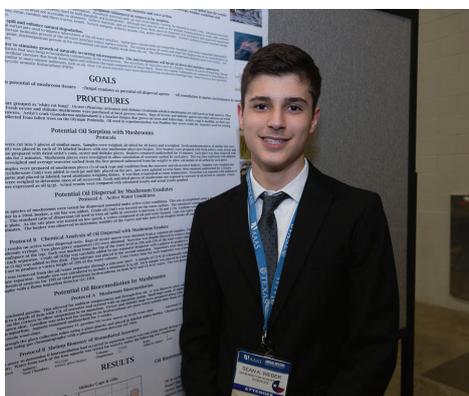
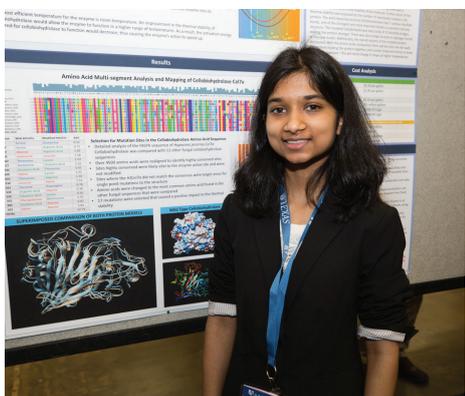


Friday morning the students attended the AJAS “Breakfast with Scientists” where they engaged prominent professionals one-on-one. Neha is shown (in the photo below) having breakfast with Dr. Josh Freeman, Chief Digital Media Officer of Science Magazine.



On Friday afternoon, our students participated in the poster session, held in the AAAS exhibit hall. Neha’s poster was titled **“Application of Machine Learning Algorithms to Predict and Detect Epileptic Seizures Using EEG Data.”**

Eshika’s poster was titled **“Computational Techniques for Revealing Physiological and Biometric Signals Hidden in Standard Videos for Remote, Contactless Monitoring of Cardiovascular Health and Identity Authentication.”**



Sagarika’s poster was **“Designing a Thermostable Cellobiohydrolase; A Novel Approach to Sustainable Ethanol Production.”**

Sean’s poster was **“Myco-Treatment of Marine Oil Spills.”**

Late Friday afternoon we attended the AAAS plenary lecture by Dr. Ellen Ochoa, veteran astronaut and 11th director of the Johnson Space Center. Her lecture was titled “The International Space Station: A Laboratory in Space.”

Friday evening was the banquet honoring the new AJAS Fellows, held under the rotunda in the Texas State History Museum.

Saturday morning the students were invited to attend AAAS presentations of their choice. Saturday afternoon they were given the choice of an oral presentation of their work in a traditional seminar format, or a roundtable discussion.

Late Saturday afternoon we attended a plenary lecture by Dr. Cori Bargmann, distinguished neurobiologist. In 2012 she was awarded the \$1 million Kavli Prize, and in 2013 the \$3 million Breakthrough Prize in Life Sciences. In 2016 she was named the President of Chan Zuckerberg Science, a bold \$3B initiative to “help cure, manage, or prevent all disease by the year 2100.”



The Saturday AJAS dinner was at Uncle Julio’s, sponsored by the Seattle Foundation, where students were able to mingle with the delegates from other states.



Later Saturday evening, the new Fellows were treated to a magician and mentalist act back at the hotel.

The National Association of Academies of Science (NAAS) is a not-for-profit organization whose mission is to promote the scientific and science education goals of state, regional and municipal academies of science. The NAAS consists of 47 state and regional academies of science,

which are organized to encourage all facets of scientific inquiry and experiences. One of the most important functions of the NAAS is the sponsorship and parent organization of the American Junior Academy of Science (AJAS). They had a meeting on Friday, attended by WSAS Executive Director Donna Riordan.

I attended the NAAS meeting briefly, and took some notes about Sigma Xi, the Scientific Research Society. Sigma Xi chapters are mostly inactive in Washington State, but last year I located a representative in Richland who agreed to supply an award for the Washington State Science & Engineering Fair. I joined Sigma Xi so I could act as agent and judge, and we presented a certificate and monetary award this year at the Fair.

Sigma Xi has relaunched their publication, Chronicle of The New Researcher, a professionally refereed journal for high school researchers. A previous Washington AJAS Fellow (Thorsen Wehr) had his work published in 2014.



A review of how our AJAS selection process works: we ask the State's science fairs and competitions to give us a list of their top award winners. We invite these students to apply for the AJAS award by submitting their research report, a personal essay, and their high school transcript. This year we had 11 applicants, from which we chose the top four.

Photo shows the new 2018 AJAS fellows from 22 states.



In 2019 the AAAS-AJAS meeting will be in Washington DC and the 2020 meeting is coming to Seattle.

A footnote to last year: We don't know if the 2017 Boston/AJAS Conference had any influence, but last year's delegates Adeline Hillier and Harshu Musunuri have both been admitted to MIT.

I greatly enjoyed serving as one of the chaperones at this event and I think this is a wonderful opportunity every year for a few Washington student scientists to get connected with the world community of scientific professionals.

WSAS American Junior Academy of Sciences (AJAS) Award Recipients

Representing Washington State at the 2019 Annual AJAS Convention

Students selected for their excellent academic record, with strong scientific merit and a strong interest in science or engineering and research.

Nikhil Devanathan

Kennewick High School

*Aware of Air: Measuring Local Air Quality
Using Portable Arduino-based Sensors*

Ronit Jain

Interlake High School

*Next Generation Morphological and
Molecular Analysis of the Toxicity
of Pharmaceutical-Derived Aquatic
Contaminants (PPCPs)*

Savitha Srinivasan

Interlake High School

*Development of Semi-Supervised Machine
Learning Models to Predict Enhancer
Regions in Polygenic Developmental
Diseases*

Verona Yue

Forest Ridge School

*An Optogenetics Approach: The
Formation of Chemosensory Habituation
in *C. elegans* Affected by the
 γ -Aminobutyric Acid and Acetylcholine
Neurotransmitters*

Finalists for the AJAS Award

Rahul Ram

Camas Island High School

Sathvik Nallamalli

Olympia High School

WE WOULD LIKE TO THANK OUR 2019 SPONSORS ON BEHALF OF OUR STUDENTS, TEACHERS, AND MENTORS!

**THE BOEING COMPANY • VULCAN INC.
MR. GARY FOSS**

Synopsis: Cannabis and humans have a long, complex and intertwined history. Many claims have been made suggesting that cannabis has significant therapeutic potential for numerous physical and mental ailments. Similarly, cannabis has been vilified because of the putative risk it poses to the health of individuals and the fabric of societies. Recent policy shifts at the level of states have made cannabis much more accessible for both medical and recreational purposes. The federal government, however, continues to regulate cannabis as a dangerous substance. Where is the truth? Is cannabis a panacea? Is it a toxic threat to all we hold dear? Perhaps, like many drugs and medical interventions, the truth resides in the middle of the extreme endpoints. The obvious way to answer these questions and to identify areas where cannabis may have benefit and where it may pose risk is through the conduct of rigorous scientific exploration. Unfortunately, the tension between state and federal regulations makes conducting this badly needed research challenging—so challenging that many scientists who are capable of conducting studies to provide much needed data on cannabis shy away from engaging in the research.

This symposium will outline the history of cannabis use and the data supporting its utility for improving the human condition, as well as its linkage to deleterious impacts. The symposium will then explore, in detail, the regulatory and practical challenges of conducting research with/on cannabis. This will include research that ranges from foundational medical experimentation to work in highly applied real-world settings. Presenters will also discuss strategies that allow research to be done while remaining compliant with the regulatory environment.

Attendees should leave with a greater understanding of the potential benefits and risks of cannabis use, as well as with an appreciation for the challenges of conducting research in this area. Finally, researchers will learn about strategies and procedures that allow them and their institutions to engage in and support this research while remaining compliant with prevailing regulations.

Format: A 5-hour symposium (12:30 to 5:30 pm) consisting of presentations organized around several thematic areas followed by facilitated question and answer session at the end of the symposium.

WASHINGTON STATE
11TH ANNUAL MEETING & SYMPOSIUM
September 13, 2018 | Museum of Flight, Seattle, WA
THE HIGHS AND LOWS OF CONDUCTING RESEARCH ON CANNABIS IN WASHINGTON STATE

SYMPOSIUM AGENDA

Symposium Introduction

12:30 – 12:40 *Ron Thom, President*

A Brief History of Cannabis

12:40 - 1:00 *John Roll, Symposium Chair, Professor and Vice Dean for Research, Elson S. Floyd College of Medicine, Washington State University, "A Brief History of Cannabis and Humanity"*

Federal and State Regulatory Environments for Cannabis Research

1:00 - 1:45 *Dan Nordquist, Associate Vice President for Research Support and Operations, Washington State University, "Current Regulatory and Administrative Landscape of Marijuana Research"*

1:45 – 2:05 *Laura Lavine, Assistant Director, Office of Research, College of Agriculture, Human, and Natural Resource Sciences, Washington State University, "Opportunities and Challenges for Hemp as an Agricultural Commodity"*

2:05 – 2:20 **BREAK**

Cannabis Research

Prevention

2:20 – 2:40 *Kevin Haggerty, Endowed Associate Professor in Prevention, University of Washington, "Six Lessons Learned from Marijuana Legalization in Washington State: One Researcher's Perspective"*

2:40 – 3:00 *Laura Hill, Professor and Chair, Department of Human Development, Washington State University, "Policy Complications of Implementing Evidence-Based Prevention After Legalization"*

3:00 – 3:20 *Celestina Barbosa-Leiker, Associate Dean of Research, College of Nursing, Washington State University, "Daily Cannabis Use During Pregnancy and Parenthood"*

Health/Social Impacts Research

3:20 – 3:40 *Nephi Stella, Professor of Pharmacology and Psychiatry and Behavioral Sciences, University of Washington, "Optimizing the Medical Properties of Cannabis: from Concept to Proof-of-concept"*

3:40 – 4:00 *Matt Layton, Clinical Education Director, Mind, Brain and Behavior, Elson S. Floyd College of Medicine, Washington State University, "The Cannabis Conundrum: Applying for a DEA Schedule 1 Human Research Certificate"*

4:00 – 4:20 *Michael McDonell, Associate Professor, Elson S. Floyd College of Medicine, Washington State University, "The Impact of Cannabis on Mental Health"*

4:20– 4:35 *Nicholas Lovrich, Regents Professor Emeritus, Politics, Philosophy and Public Affairs, Washington State University, "Roadway and Workplace Cannabis Impairment: Progress to Date & Future Developments"*

4:35-4:50 **BREAK**

Research Informing Medical and Behavioral Health Practice and Policy

4:50 – 5:05 *Dennis Donovan, Director, Alcohol and Drug Abuse Institute, University of Washington, Discussant*

5:05 – 5:20 *Rita Fuchs Lokensgard, Director, Alcohol and Drug Abuse Research Program, Washington State University, Discussant*

Next Steps for WSAS

5:20 - 5:30 **Discussion facilitated by John Roll**

5:30 **ADJOURN**

WASHINGTON STATE
11TH ANNUAL MEETING & SYMPOSIUM
September 13, 2018 | Museum of Flight, Seattle, WA
THE HIGHS AND LOWS OF CONDUCTING RESEARCH ON CANNABIS IN WASHINGTON STATE

SYMPOSIUM SPEAKERS

John Roll, Symposium Chair, "A Brief History of Cannabis and Humanity"



Dr. Roll is currently a Professor and the Vice Dean for Research for the Elson S. Floyd College of Medicine and the Associate Vice President for Health Sciences Research for Washington State University. He is the Founding Director of the WSU Program of Excellence in Addictions Research (PEAR) and is the Co-Director of the WSU Translational Addiction Research Center (TARC). Dr. Roll holds faculty appointments in the WSU Departments of Medicine, Psychology, Neuroscience, Nursing, Prevention Science, Nutrition Exercise and Physiology and Health Policy Administration. He was appointed by Washington state Governor Gregoire as an Executive Commissioner on the Eastern State Hospital Advisory Board and as a Vice Chair of the Governor's Council on Substance Abuse. Roll is a Fellow of the following organizations: American Psychological Association, Association for Behavior Analysis International, Association for Psychological Science, and the American Association for the Advancement of Science. He has published more than 160 scholarly articles.

Dan Nordquist, "Current Regulatory and Administrative Landscape of Marijuana Research"



Dr. Nordquist is the Associate VP/Deputy VP for Research Support and Operations for Washington State University and reports to the Vice President for Research. Dan oversees the pre-award office, Conflict of Interest (COI) management, the OR Information Technology group, and supports the implementation of the University's research strategic plan. In addition, as directed by the VPR, in the role of Deputy VPR, Dan provides support and operational services to all Office of Research Units.

He started at WSU in 1990 working at the local, college, and central levels. All of his roles encompass research administration and operations. Dan is active nationally and internationally in various leadership roles and participates in national working groups associated with research administration.

Dan has significant experience as a member or in support of many WSU committees including IRB, IBC, IACUC, RSC, Intellectual Property, Research and Arts, Audit Steering Committee, Investment Review and Plan Oversight Advisory Committee, and the Committee on Cannabis Research and Outreach.

Laura Lavine, "Opportunities and Challenges for Hemp as an Agricultural Commodity"



Dr. Lavine is the Associate Director of the Washington State University, College of Agricultural, Human and Natural Resource Sciences, Agricultural Research Center/Office of Research. She has also recently been named the Chair of the WSU Department of Entomology. Dr. Lavine is a Full Professor whose research on the evolution of adaptation has been published in such journals as Science, Proceedings of the National Academy of Sciences, and Nature to name just a few. Dr. Lavine is committed to teaching and has been honored with the WSU CAHNRS Wade Excellence in Teaching award. Dr. Lavine has shown an ongoing and dedicated commitment to inclusion and diversity in higher education and was awarded the Samuel H. Smith Leadership Award in 2016 by the WSU Association for Faculty Women. Dr. Lavine received her Ph.D. in Entomology at the University of Kentucky in 1999

and was a USDA NIFA Postdoctoral Fellow at the University of Wisconsin-Madison with National Academy of Science member Michael R. Strand before coming to WSU in 2001.

Kevin Haggerty, *“Six Lessons Learned from Marijuana Legalization in Washington State: One Researcher’s Perspective”*



Dr. Haggerty is the Director of the Social Development Research Group and Endowed Professor of Prevention at the UW School of Social Work. He is a principal investigator on a variety of projects, including Utah Communities That Care Training program, Staying Connected with Your Teen, Families Facing the Future (formerly Focus on Families) and a National Institute on Drug Abuse-funded study on Family Connections. He is an investigator of the Community Youth Development Study, which tests the effectiveness of the Communities That Care (CTC) program. Dr. Haggerty specializes in prevention programs at the community, school and family level. For more than 30 years, he has focused on developing innovative ways to organize the scientific knowledge base for prevention so that parents, communities and schools can better identify, assess and prioritize customized approaches that meet their needs. An expert on substance abuse and delinquency prevention, Dr. Haggerty speaks, conducts trainings, and writes extensively on this field.

Laura Hill, *“Policy Complications of Implementing Evidence-Based Prevention After Legalization”*



Dr. Hill is a professor and chair of the Department of Human Development and faculty in the interdisciplinary Prevention Science PhD program at Washington State University. Dr. Hill studies implementation and dissemination of research-based programs as they move into community settings. A primary aim of her translational research program is to improve the efficiency, effectiveness, and evaluation of preventive interventions in uncontrolled, real-world settings.

Dr. Hill is a member of the Board of Directors of the Society for Prevention Research and chair of its Training Committee. She co-chairs the Prevention Research Subcommittee of the Washington State Division of Behavioral Health and Recovery and is a member of the state's Department of Health committee addressing education and prevention related to the legalization of cannabis. Previously, she chaired the Committee on Cannabis Research and Outreach. Her research on program implementation, adaptation, and economic evaluation has been funded by the National Institutes of Health, other federal and state agencies, and private foundation grants.

Celestina Barbosa-Leiker, *“Daily Cannabis Use During Pregnancy and Parenthood”*



Dr. Barbosa-Leiker is the Associate Dean for Research and an Associate Professor in the College of Nursing at Washington State University (WSU). She is also the Director for the Program of Excellence in Addictions Research and a member of the Committee on Cannabis Research and Outreach at WSU. Dr. Barbosa-Leiker’s primary research investigates gender differences in opioid use. Her research has demonstrated sex differences in the measurement of opioid withdrawal, relapse while in treatment, and predictors of relapse. Her additional line of research focuses on the transition from pregnancy to parenthood in women with substance use disorders. She is currently leading an interdisciplinary research team to assess mothers, infants, and healthcare providers in order to better care for women with opioid use disorders, as well as for women using cannabis during pregnancy. The results of these studies will help better educate healthcare providers and pregnant women, inform maternal and infant health policy, and improve standards of care. Dr. Barbosa-Leiker has methodological expertise in psychometrics and longitudinal latent variable modeling.

Nephi Stella, *“Optimizing the Medical Properties of Cannabis: from Concept to Proof-of-concept”*

For over 20 years, Dr. Stella has studied the molecular mechanism and therapeutic value of cannabinoid-based molecules (phytocannabinoids and synthetic cannabinoids) and endogenously-produced cannabinoids (endocannabinoids) for the treatment of various diseases of the brain, including epilepsy and brain cancer. His initial work led to the discovery of both the prominent endocannabinoid, 2-arachidonylglycerol (2-AG), in the brain, and its key degrading enzyme, ABHD6, that controls the activity dependent production of 2-AG in the brain. The body of work started at the University of Washington led to the optimization of several medicinal properties of phytocannabinoids (such as cannabidiol), synthetic cannabinoids (such as ST compounds) and targeting ABHD6 for the treatment and possible cure of devastating diseases such as Dravet Syndrome, glioblastoma multiform and brain metastasis. In 2011, he founded Stella Therapeutics, Inc; a University of Washington start-up company dedicated to developing cannabinoid-based drugs the safely treatment of cancer. In 2017, Dr. Stella became director of the University of Washington Center for Cannabis Research.

Matt Layton, *“The Cannabis Conundrum: Applying for a DEA Schedule 1 Human Research Certificate”*

Dr. Layton is the Medical Director for the WSU Program of Excellence in Addictions Research and Physician-Record for the WSU Sleep and Performance Research Center in addition to his appointments as a Clinical Professor in the UW Department of Psychiatry and Behavioral Sciences and in the Department of Medical Education and Clinical Sciences in the Elson S. Floyd College of Medicine at WSU. Dr. Layton is certified by the American Board of Psychiatry and Neurology, and he is a Distinguished Fellow of the American Psychiatric Association and a Fellow in the American College of Psychiatrists. He is also a member of the American Medical Association, Washington State Psychiatric Association, Washington State Medical Association, and the Spokane County Medical Society. He has published numerous scientific articles in the fields of psychopharmacology and neuroimaging, presented research findings in national and international forums, and received awards from the National Alliance for Research in Schizophrenia and Depression, National Institute of Mental Health, American Federation for Clinical Research, American Psychiatric Association, Washington Community Mental Health Council, and he is listed as one of “America’s Top Psychiatrists”.

Michael McDonell, *“The Impact of Cannabis on Mental Health”*

Dr. McDonell is an Associate Professor in the WSU Elson S. Floyd College of Medicine and an Affiliate Associate Professor in the UW Department of Psychiatry and Behavioral Sciences. He is the Chair of the Committee for Cannabis Research and Outreach at WSU and a member of the Program of Excellence in Addictions Research (PEAR). Dr. McDonell has an extensive background in developing and testing the effectiveness of treatments for co-occurring substance use disorders and severe mental illness. He is also active in public health research and behavioral interventions in American Indian and Alaska Native communities, as well as research focused on first episode psychosis and child abuse prevention. Dr. McDonell has published more than 50 articles, chapters, and books in the areas of substance use and psychiatric disorders. His clinical background includes over 14 years of delivering evidence-based interventions for addiction and mental health problems in community clinics. Significant awards include the American Fisheries Society Fish Health Section S. F. Snieszko Distinguished Service Award and the US Department of the Interior Distinguished Service Award. He is an author of more than 200 scientific publications.

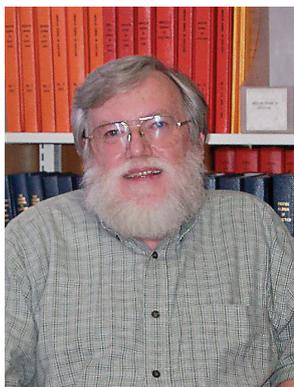
Nicholas Lovrich, *“Roadway and Workplace Cannabis Impairment: Progress to Date & Future Developments”*



Dr. Lovrich enjoys the rank of Regents Professor Emeritus in the School of Politics, Philosophy and Public Affairs and the honor of holding a Claudius O. and Mary W. Johnson Distinguished Professorship in Political Science at WSU. He is currently on partial appointment as a research affiliate in the Department of Criminal Justice and Criminology, serving as a Co-PI on a 3-year grant from the National Institute of Justice to document the impact of marijuana legalization on police and crime in Washington. He is the author/co-author/co-editor of 13 books, 175 peer-reviewed articles, and over 20 edited book chapters. He chaired 30 PhD dissertation committees at WSU.

Since 2010 he has been working with Herb Hill and Brian Clowers in the WSU Department of Chemistry to develop a means of rapid field detection of THC by means of the application of ion mobility spectrometry (IMS) in law enforcement and workplace safety settings. The WSU team has been coordinating efforts with Michael Milburn (UMass, Boston) for the past two years to collect data simultaneously on THC exposure and cognitive/motor skills driving impairment.

Dennis Donovan, *Discussant*



Dr. Donovan received his Ph.D. in Clinical Psychology from the University of Washington, where he is Director of the Alcohol and Drug Abuse Institute and Professor in the Department of Psychiatry and Behavioral Sciences. He has over 35 years of experience as a direct service provider, treatment program administrator, and clinical researcher in the alcohol and drug dependence field. He served as the Associate Director and Acting Director of the Department of Veterans Affairs Center of Excellence in Substance Abuse Treatment and Education. His research has been funded by the National Institutes of Health, and has resulted in 220 peer-reviewed publications, 35 book chapters, and 5 books. He has served as an assistant editor and member of the editorial boards for a number of professional journals. He is the Principal Investigator of the Pacific Northwest Node of the NIDA National Drug Abuse Treatment Clinical Trials Network (CTN). He has served as President of the Society of Psychologists in Addictive Behaviors and is a Fellow

in Divisions 28 (Psychopharmacology and Substance Abuse) and 50 (Society of Addiction Psychology) of the American Psychological Association.

Rita Fuchs Lokensgard, *Discussant*



Dr. Fuchs Lokensgard is a Professor in the Department of Integrative Physiology and Neuroscience at Washington State University (WSU) and Director of the WSU Alcohol and Drug Abuse Research Program (ADARP). Dr. Fuchs Lokensgard's laboratory utilizes rodent models to explore neural circuitry and cellular mechanisms by which drug-associated environmental stimuli elicit craving and motivation for drugs of abuse in substance abusers. Her research is funded by the National Institute on Drug Abuse and Washington State Initiative 171. As director of ADARP, Dr. Fuchs Lokensgard administers research grant competitions and other programs designed to foster substance abuse research at WSU. ADARP is funded through Washington State Initiatives 171 and 502.