Self-Study Document
Academic Program Review, 2019

Department of Statistics
College of Arts and Sciences

Degrees Offered:

- Bachelor of Science (Statistics)
- Statistics Minor
- Master of Science in Statistics – Advanced Methods and Data Analysis (Fee-Based Program)
- Master of Science (Statistics) – Part-Time and Concurrent Program
- PhD in Statistics

Inter-disciplinary Programs (not included in this review):

- Bachelor of Science in Applied and Computational Mathematical Sciences (ACMS)
- Masters in Data Science

Year of last review: 2009

Chair of Department (until June 30, 2019): Thomas S. Richardson

Date submitted: 03-15-2019

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1 Vision and Mission Statements

Vision

Since its inception, the department has pursued a distinctive vision:

- That the development of statistical methodology is the principal role of statistics as a discipline;
- that this development of methodology must be driven by applications, with statistical theory employed to understand and evaluate new methods;
- that such developments should be attuned to advances in computation.

Mission

The primary academic mission of the Department of Statistics at the University of Washington is to *develop and disseminate rules of discovery and inference for empirical patterns in quantitative studies*, especially studies involving novel instrumentation or novel scales of information resources.

To help assure the scientific relevance and import of its activities, the Department places strong emphasis on collaborative, interdisciplinary research, which is a distinguishing feature of its graduate program.

The Department is committed to excellence in statistical education. The Department will:

- Offer high-quality training of undergraduates in "statistical thinking" and basic statistical methodology;
- Maintain a vibrant graduate program that will educate PhDs for positions in top-ranked academic and research institutions;
- Pursue opportunities for outreach and improve the quality of statistical education for Washington students.

The statistical sciences are inherently interdisciplinary. To this end, the Department will:

- Play a central and transforming role in a wide variety of scientific disciplines;
- Form true interdisciplinary partnerships to fundamentally change the nature of scholarship;

- Provide consulting services to the UW community, government institutions and industry thereby helping scientists in other fields to think statistically and use statistical methods.

The Department is committed to supporting the University, the state, and the scientific community. The Department will participate in the identification and solution of problems facing society.

2 Overview of Organization

The Department of Statistics at the University of Washington is one of the leading departments in the world. It is consistently ranked within the top 10, if not top 5, departments nationwide. According to the summary of the most recent 2010 National Research Council (NRC) assessment prepared by the UW Graduate School, the program in Statistics is "very highly rated".[1] In the 2018 U.S. News and World Report Rankings, University of Washington was (joint) eighth among Statistics and Biostatistics programs. There are only four Statistics programs ranked higher (Stanford, Berkeley, Harvard and Chicago). In the combined list, UW Biostatistics, is ranked (joint) third, which is relevant in that the UW Statistics and Biostatistics PhD programs are closely integrated. Although rankings of this type are intrinsically reductive, they are indicative of the high esteem in which the program is regarded by others working in the field. These rankings are also undoubtedly an important factor in the very high quality of graduate students who enroll in our MS and PhD programs, and in the stellar junior faculty that we have recently recruited.

Since our last review in 2009 the Department has started a number of new ventures, including a new PhD track in Machine Learning & Big Data, and a full-time (fee-based) MS degree and an inter-disciplinary MS in Data Science. Our undergraduate major has grown and now has competitive admission. In addition, the Statistics track within the inter-disciplinary Applied and Computational Mathematical Sciences (ACMS) major has been relaunched as a Data Science and Statistics track.

[1] In more detail, in the NRC study the UW Statistics PhD program's ranking by other scholars (S-rank) was 2-4; and its Research Rank was 3-6. For comparison: Stanford's received (1-1 and 1-1); Harvard (2-3 and 2-2); UC Berkeley (4-9 and 3-7); University of Chicago (4-9 and 5-15); University of Michigan (4-12 and 5-17); Cornell Biometry (4-18 and 3-18); these were the only comparable institutions on this measure.
https://www.chronicle.com/article/nrc-rankings-overview-/124660

2.1 Introduction

Within the last three decades, data collection has become ubiquitous in all aspects of science and society, and the rate at which this data is being collected and curated has accelerated, growing exponentially. There has been a concomitant growth in the breadth of problems to which statistical methods may be applied. Central to statistical thinking is the notion that by abstracting the underlying structure of an inferential task or problem, insights and methods can be applied to many different fields of inquiry.

Development of tools cannot take place in a vacuum; it has to be problem driven. Finding and understanding inferential problems requires interaction with other scientific disciplines that acquire and analyze data such as Genetics, Epidemiology, the Social, Environmental, and Atmospheric Sciences, Global Health, etc. Since its founding in 1979, the Department has placed great value on collaborative research, which it has regarded as being central to the continuing viability of the discipline. This is also reflected in the large number of faculty with joint appointments.

A central part of the department's mission is also to train students at all levels in the theory, development and application of statistical techniques and to serve as a coordinating hub for statistical education within other disciplines. This has been central to the mission of the Department since it was established four decades ago on July 13, 1979. The board of Regents approved the Recommended Action of Provost George Beckmann, which noted that Statistics was becoming increasingly important to many different disciplines across the whole campus, concluding that:

> *A strong need exists to create a unit which will better coalesce and coordinate these efforts in the teaching and research of statistics and probability, and to serve as a focal point for the utilization of the tremendous talent in this area that exists on campus.*

Within the last ten years there has also been a large growth of interest and opportunities in Data Science, which has led to a growth in related options and tracks within existing majors. As described below, the department has been actively engaged in ensuring that Statistics plays a central role in these developments at both the graduate and undergraduate level.

2.2 Commitment to Diversity

A commitment to diversity is central to the academic mission of our department. We take our lead from the definition of diversity present in the University's statement of values:

> *It is the mission of the University of Washington to break down barriers and create a path for those who have been systematically excluded throughout history [...] Diversity is defined herein as groups or individuals from historically underrepresented and underserved populations with different culture or background, including but not limited to, race, socioeconomic status, ethnicity, sex, gender identity or expression, sexual orientation, marital status, age, disability, religion, and military status [...] and individuals who express multiple minority identities.*

As a department we seek to further diversity by striving collectively to achieve the following goals:

1. *To recruit and retain members from diverse communities for our students (undergraduate and graduate), faculty, and staff;*
2. *To promote access to departmental, campus-wide and external resources that support diverse communities, both socially and financially;*
3. *To seek out best practices for promoting equality and inclusivity in our community, classrooms, meetings, and events, both on an institutional and an interpersonal level;*
4. *To seek out best practices for identifying and addressing barriers to equality and inclusivity in our community, both on an institutional and an interpersonal level;*
5. *To collectively participate in the above efforts, recognizing that we are all responsible for supporting diversity, equality, and inclusivity in our community.*

The department has taken concrete steps designed to help achieve these objectives, which are described later.

2.3 Degree Programs

During its first three decades, the focus of the Department was primarily on undergraduate service teaching, upper division courses for Mathematics majors and on training PhD students. The department offered a concurrent MS programs to provide a terminal degree for students leaving the PhD program. These also provided opportunities to a small number of PhD students in other programs, and local professionals to obtain an MS. During the last decade we have witnessed a rapid expansion of our activities at the MS level:

- Since the last review we have created a new full-time (fee-based) MS program that is distinct from the PhD program. The program has been successful with cohorts of approximately 25 students. This program has already graduated nearly 90 students; see Table 10.

- In 2014, in collaboration with Applied Mathematics, Biostatistics, the Allen School for Computer Science & Engineering, Human-Centered Design & Engineering and the Information School, we launched an interdisciplinary Professional Masters Degree in Data Science that is aimed at working professionals. This program has grown very quickly and will enroll approximately 50 students this year; see Table 14.

We have always had an undergraduate major, but for a long-time we encouraged students who were interested in Statistics to obtain an undergraduate degree in Mathematics (or ACMS) before pursuing Statistics at the graduate level. However, since the last review we have invested significant energy into growing our major, increasing the range of courses available and improving the student experience. An important milestone took place in 2013 when our undergraduate major changed to have competitive entry. Within the last year we have also created a Data Science track within our major.

In 2017 we re-launched the Statistics option within the ACMS major, as a "Data Science and Statistics" option, revising the curriculum at the same time. This has also led to a significant increase in enrollments.

2.4 Staffing

At the start of academic year 2019-20, the full-time faculty will consist of:[2]

- 10 Professors, corresponding to 7.75 FTE: Six are 100%; three are 50%; one teaches one course (and is WOT);[3]

- 5 Associate Professors corresponding to 2.0 FTE: One is 100%, the other four teach only one course for Statistics (25%);

- 3 Assistant Professors corresponding to 3.0 FTE.

Thus the total tenure-track FTE next year is 12.75. Further retirements of two (100%) Full Professors are expected at the end of AY 2020-21. If we do not hire

[2] Principal Lecturer June Morita, and Professor Martina Morris will retire this summer.

[3] We have two 0% faculty, appointed in Biostatistics, who are not included here.

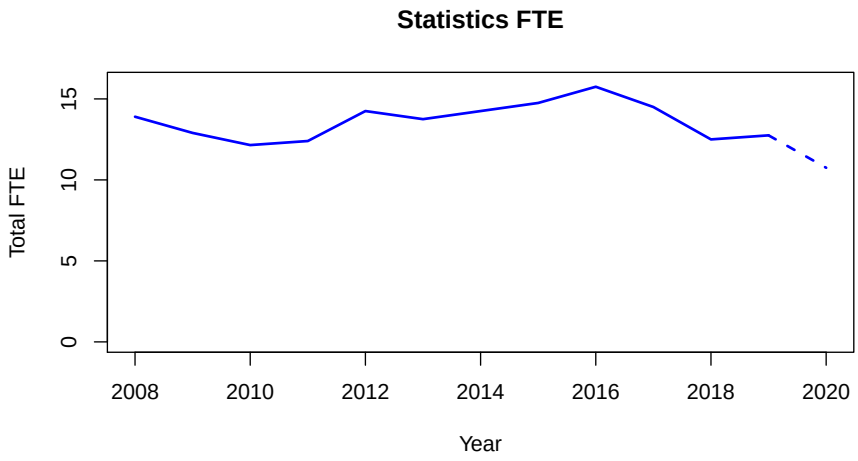

Figure 1: Projected Statistics Faculty FTE to 2020 (without hiring in AY19-20).

next year this will lead to a total FTE of 10.75.[4] This will represents a reduction of **32%** relative to the faculty at its maximum size in 2016. See Figure 1.

Other faculty who play important roles in the Department include:

- 4 Part-Time (50%) lecturers;
- 6 Emeritus Professors;
- 13 Adjunct Faculty from other campus departments;
- 22 Affiliate Professors from local industry and other universities.

We have 8 full-time staff who work in two teams:

- An administrative and advising team (5) consisting of the Departmental Administrator, PhD Program Advisor, an MS and BS Program Advisor, an Administrative Assistant and an Assistant to the Chair.
- A computing and IT team (3), consisting of a Director of IT; a Linux Systems Administrator and a Web Developer.

[4] In addition, we have two faculty members who were on unpaid leave this year and will be on unpaid leave in the upcoming year. This reduces our effective FTE by a further 1.25.

2.5 Shared Governance

As appropriate for a relatively small unit, the administrative structure of the Department is simple and direct; see organizational chart in Figure 8 in Appendix A. The Chair directly supervises the Administrator and Director of IT. The Administrator supervises the administrative staff while the IT Director supervise the computing staff. In addition the faculty undergraduate and graduate advisors both report to the Chair.

Many decisions are taken at faculty meetings with all faculty providing input. There are a number of standing committees that deal with specific tasks:

- **Admissions committees:** Decide which applicants should be admitted to our degree programs. Committees exist for our major, for the Full-Time MS and PhD programs. Faculty also serve on inter-departmental committees for the Data Science MS and ACMS.
- **Diversity Committee:** Works to achieve our goals in terms of increasing inclusion and diversity within the department. Helps to plan outreach activities and provides input on our admission requirements and criteria.
- **Teaching and Curriculum Committee:** Determines questions arising that relate to syllabi, course offerings, including courses offered by other departments and graduation requirements.
- **Pedagogy:** Organizes quarterly presentations on topics related to the practicalities of teaching.
- **Faculty recruiting:** Actively searches for suitable faculty candidates, evaluates and ranks applicants, prepares recommendations to the faculty. (Currently dormant, as we are not searching this year.)
- **Exam committees:** Coordinate the development, presentation and assessment of core common exams in the graduate program. Committees exist for the M.S. Theory Exam and Ph.D. Research Prelim. Two statistics faculty also serve on the Biostatistics PhD Theory exam committee (the chair rotates between the departments).

Ad hoc committees are formed for specific purposes for example: overhauling the web-site.

Faculty meetings take place on Mondays approximately four or fives times per quarter. The agenda is distributed in advance with solicitation of additional agenda items welcomed. Part-time (non-voting) faculty are also welcome to attend and

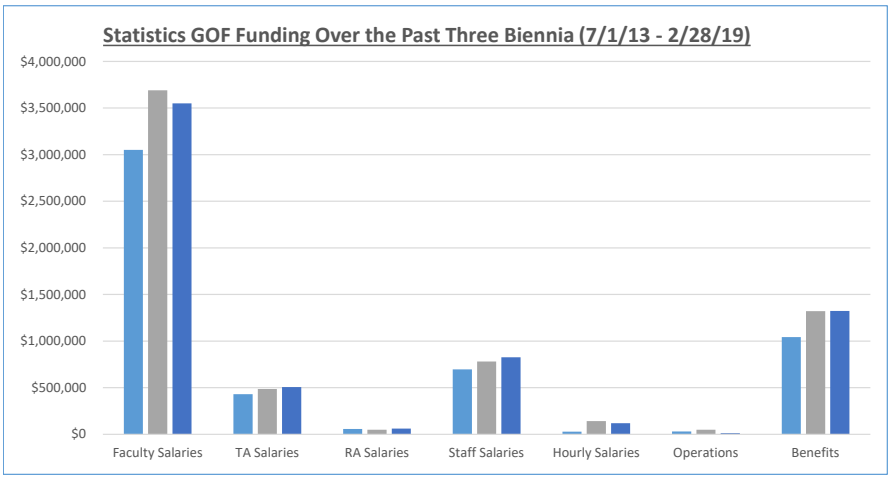

Figure 2: Statistics GOF Budgets over the last three biennia. See Appendix B for details.

often do so. Specific meetings are designated in the Fall and Winter for reviewing the progress of PhD students. There is a meeting in the Spring to discuss MS students. Unused slots are used for the Teaching and Curriculum Committee, for PhD Admissions and for the Pedagogy Committee (typically on Monday of finals week).

The PhD students elect one or (more recently) two students to serve as graduate student representatives (GSRs). These students attend faculty meetings and act as a liaison between PhD students and the faculty. A staff member always attends to record the meeting, votes and attendance, as well as providing the staff perspective.

GSRs do not attend meetings where students are reviewed. In addition, when necessary, the meeting will move into a closed session including only faculty of a certain rank or higher, depending on the personnel decision under consideration.

There are several student-run organizations associated with our department, including the *Statistics and Probability Association*, which is the undergraduate organization for our majors and *Women in Biostatistics and Statistics* (WiBS), a group organized by female-identifying graduate students in Statistics and Biostatistics; see Section 2.7 below for more details.

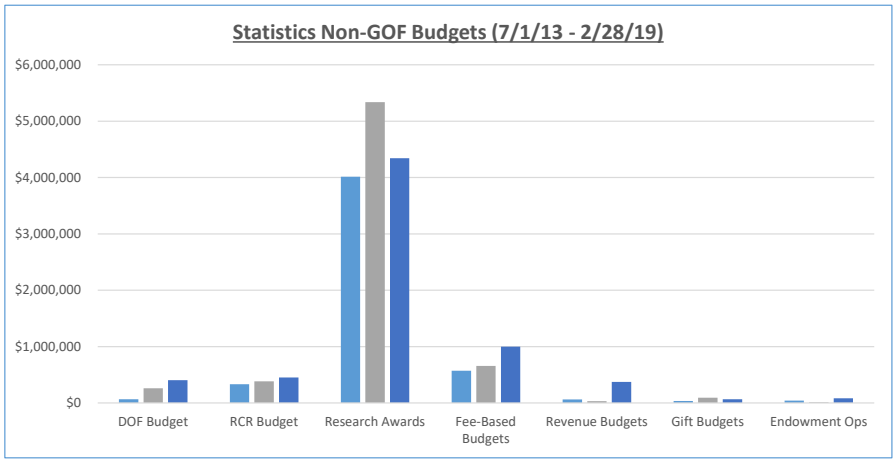

Figure 3: Statistics non-GOF Budgets over the last three biennia. See Appendix B for details.

2.6 Budgets and Resources

The department has a number of different revenue streams with which it supports operations. A high-level breakdown for the last three biennia is presented in Figures 2 and 3. A detailed breakdown and explanation of the various funding sources is provided in Appendix B.

Since the last review we have added three new sources of funding:

- Our full-time MS program generates funds that support program costs, including the salaries of faculty and students teaching in the program. The program also generates revenue beyond these costs. We have used this revenue primarily to hire teaching faculty. We also use this revenue to help fund faculty start-up packages and retentions. These funds have allowed us to continue to increase our graduate program and course offerings even though our full-time tenure-stream faculty numbers and allocation of permanent TA slots have declined.

- Revenue from the Data Science MS program covers costs, but also generates additional revenues. This is shared with the other departments participating in the program (the division is proportional to student credit hours that are taught).

- The Coursera Specialization in Machine Learning, created and taught by

Emily Fox and Carlos Guestrin (CSE), generates royalty revenue for the department (shared with CSE).

TA Funding

As the number of students in our courses have grown we have employed additional Teaching Assistants (TAs) and graders to help with the larger class sizes and additional offerings; see Table 6 in Appendix B. As can be seen, permanent funds allocated from the College for TA funding now pay for only 36% of our TA slots, whereas 5 years ago this was between 60% and 70%. The additional TA slots are funded partly by special temporary instructional funds, but primarily by salary released through faculty buying out with grants, being on unpaid leave or sabbatical. Our TA allocation was cut last year as part of a college budget cutting exercise. We also hire students (both PhD and MS) to serve as hourly graders for our courses.

Grant Funding

As shown in Figure 3 the Statistics faculty have been very successful at attracting grant funding. Research awards are approximately $2MM per year. Grant funding provides for faculty summer salaries, course buyouts, travel, graduate student Research Assistantships and post-doctoral researchers.

Gifts and Endowments

The department relies on gifts to fund discretionary spending including hosting speakers, providing receptions after seminars and an alumni reception (held jointly with Biostatistics) at the annual Joint Statistics Meetings. As detailed in Table 5 the department's endowment portfolio has grown to $1.5MM. Endowments are used to fund student awards and a faculty chair. We are working closely with College Advancement to explore opportunities for soliciting donations and enlarging our endowment portfolio. For example, our new web-site features a prominent 'Give Now' button.

Space

The Department of Statistics occupies approximately 7,000 square feet in Padelford Hall, primarily on the second and third floors: 51 offices, two conference rooms and a lounge. Padelford Hall was constructed in the 1960s and has a number of problems including: water leaks, insects (silverfish) and inadequate heating or cooling systems. For further details see Appendix C.

Approximately half of the faculty are jointly appointed and have access to space in new or renovated buildings in which (naturally) they often opt to work. Our space is identified by both faculty and students as putting us at a significant competitive disadvantage relative to Statistics departments at other public universities.

2.7 Diversity and Outreach

As noted above our department strives to increase diversity among students, faculty and staff. We also aim to foster a welcoming and inclusive environment.

Among the current faculty (full-time and part-time) faculty, 10 out of 24 are female.[5] Among tenure-track faculty 5 out of 19 are female. Currently five faculty are of Asian heritage and one is Hispanic. In our last faculty search (2018) we made an offer to an outstanding African-French candidate. However, unfortunately he declined our offer. We will continue outreach efforts with aim of ensuring a large and diverse pool of well-qualified candidates in future searches.

In 2016, the Department created a Diversity committee, including faculty, staff and graduate students, to identify and implement strategies by which diversity can be increased. Actions recommended by the committee that have already been implemented include:

- Formulation and adoption of a Diversity Statement; this is displayed prominently on our web-site.
- Adoption of 'Green Dot' by-stander intervention training to help reduce instances of sexual harassment or assault. Separate sessions were held for faculty and graduate students at the end of Spring Quarter 2018.
- Commissioning of a climate survey by the UW Center for Evaluation & Research for STEM Equity (CERSE). A pilot survey including focus groups for different subsets of staff, faculty and students was carried out in Spring 2018. A follow-up survey was administered electronically at the end of November 2018. Results will be presented at a department seminar in April.
- Recommended changes to the application process for PhD students. Specifically, we now give students the option to submit a Personal Statement (in addition to their Statement of Purpose) where they can describe: "*academic experiences as an individual from a traditionally underrepresented group in higher education. [Also] experiences with underrepresented groups in*

[5] This ratio will reduce to 8/22 when Principal Lecturer June Morita and Professor Martina Morris retire this summer.

[their] research or as it relates to increasing diversity in higher education." In addition, we no longer require students to submit GRE General Test scores. This was because taking the test is a significant expense for some students.

- Overhauled our PhD admissions process to involve a more holistic review with less emphasis on standardized testing.
- Sought advice on increasing the diversity of our applicants from Associate Dean Gino Aisenberg and GO-MAP Director Cynthia Morales of the UW Graduate School. In addition we have researched successful strategies employed by UW Applied Math and Biostatistics.
- Developed contacts in universities with universities from which we hope to recruit high quality URM students.
- Created a poster to send to colleges with large minority enrollment, emphasizing that we seek diversity of economic background, and that we have an application fee waiver program for qualifying students.

As noted earlier, in 2017, female-identified graduate students set up a group, *Women in Biostatistics and Statistics* (WiBS). With funding provided by both Departments, this group organizes activities including:

- Quarterly lunches for women PhD students;
- Private group lunches with visiting speakers and local alumni;
- Panels on developing a relationship with a mentor, work-life balance, and career paths, specifically as they pertain to women PhD students
- An annual WiBS-invited seminar speaker, who is a prominent woman statistician. This speaker gives a joint Statistics-Biostatistics seminar.

The first WiBS speaker in 2018 was Professor Julia Palacios from Stanford University, who is also a UW Statistics Alumna (PhD, 2013).

We also participate in the National Name Exchange, a consortium of universities which annually collect and exchange the names of their talented and underrepresented ethnic minority students who are in their sophomore, junior or senior year of their undergraduate education.

The student organization for our majors, the Statistics and Probability Association, has also participated in recent UW Diversity fairs.

3 Degree Programs, Teaching and Learning

3.1 PhD Program

The primary objective of our PhD program is to educate students for positions in teaching and research, either in academia, or increasingly, industry.

Since it is a research degree we focus primarily on preparing our students to do research, de-emphasizing vocational training. Here is an outline of the PhD program requirements:[6]

- Students are required to demonstrate knowledge of Statistical Theory by satisfactory performance in our PhD Theory sequence (STAT 581-2-3). Students who enter without an MS are required to take our MS Theory sequence (STAT 512-3) and either pass the MS Theory Exam or achieve an average grade of 3.3 in the PhD Theory sequence.
- Students must show satisfactory performance in the Methodology sequence (STAT 570-1).
- Pass our PhD Research Prelim. This requires students to spend a quarter reproducing an existing research paper (from a list), do a write-up, make an oral presentation and answer questions.
- Serve as a Teaching Assistant for at least one quarter.
- Take a quarter of our Consulting class, which trains students by having them work with real consulting clients (as in clinical training).
- Propose and defend their dissertation.

There were 61 PhD graduates from our program from 2009-2018; see Table 8 for a detailed breakdown. The median time to degree for our students is 5.0 years (mean = 5.3); see Table 7. For comparison, 49 PhD graduated in the previous decade and the median time to degree was 5.22 years. Approximately 2/3 of the students entering our doctoral program graduate with a PhD.

There is considerable competition for places in the program. Approximately 300 students apply.We admit around 25 students, of which between 10 and 12 enroll. Approximately a third of our students are female, which broadly reflects the proportion of female students applying. About a third of our students are international, from all over the world. Graduates during the last 10 years have come from

[6] Full details are described here:
https://www.stat.washington.edu/academics/graduate/programs/phd

Canada, China, Korea, New Zealand, India, Singapore and the United Kingdom (China is the modal country of origin). See Table 9 for further details.

Every new PhD student is assigned a faculty member as an Academic advisor who helps the student with planning his or her program. There is no assumption that this advisor will become the student's thesis advisor. The Department's Graduate Program Advisor, Ellen Chan Reynolds, keeps track of each student's progress, makes sure that all the administrative requirements are met, and generally counsels the students on personal or professional problems. In addition, the graduate students have organized a system of peer mentors who are assigned to incoming students before they arrive on campus.

Though there are requirements, as noted above, the program is generally flexible with regard to timing of prelims and other requirements. In addition, students are allowed and encouraged to take electives from a broad range of other departments e.g. Applied Math, Biostatistics, CSE, EE, Math etc.,

Most doctoral students receive full financial support in the form of teaching assistantships, research assistantships, or fellowships throughout their graduate careers. Summer support is generally available for students wanting to continue their studies during the summer months.

The Machine Learning and Big Data (MLBD) optional PhD track, introduced in 2015, encourages students to take courses relating to MLBD in other departments (at least one Computer Science Course is required). The track was introduced in tandem with a similar PhD track in the CSE department.

3.2 Full-Time MS: Master's in Statistics – Advanced Methods and Data Analysis

The Department started a Full-Time MS program in 2012. Our goal was to create a program which would provide a select number of students with high-quality instruction that would prepare them for further graduate study and/or jobs in industry. The core program consists of 9 courses which can be completed in 5 quarters. However, many students opt to take additional classes and electives. first two years of our PhD program.[7]

Application to the program is highly competitive with almost 500 applicants per year. In 2017 and 2018 we admitted 82 and 94 students, respectively, leading to enrollments of 23 and 27. The students in this program do not receive financial support. Most of the students are international and from China. Tables 10 and 11 provide a detailed breakdown on graduates, applications, admissions and enrollments. A significant number of our MS graduates are successful in gaining

[7] Full details are described here:
https://www.stat.washington.edu/academics/graduate/programs/fulltimemasters

admission to PhD programs at other universities; we typically admit one or two MS students to our PhD program.

3.3 Concurrent and Part-Time MS Degrees

At the time of the last review, our only MS offerings were our Concurrent and Part-Time degrees. These were small programs that also provided a degree for PhD students who decided that they did not wish to continue. These programs were never large, but they have become somewhat smaller with the creation of our Full-Time MS Degree and our participation in the new Professional Data Science MS Degree. See Tables 12 and 13.

3.4 Professional Data Science MS Degree

In 2016, in collaboration with five other units: Applied Mathematics, Biostatistics, Computer Science & Engineering (CSE), Human Centered Design & Engineering (HCD+E) and the Information School, we launched a Professional Data Science Master's Degree. The curriculum consists of 9 core classes that are taken over a period of 1.5 to 2.5 years. Three of these classes are taught by faculty from Statistics and Biostatistics:

- DATA 556: Introduction to Statistics & Probability;
- DATA 557: Applied Statistics & Experimental Design;
- DATA 558: Statistical Machine Learning for Data Scientists.

The other classes cover: Information Visualization; Data Management; Software Design; Scalable Data Systems & Algorithms; Human-Centered Data Science. We believe that it is a great strength of this program that different units on campus are collaborating by teaching material that is central to each of their core strengths, rather than having a single department trying to cover all of these topics. In short, the program collectively is greater than the sum of its respective parts.

The program is aimed at working professionals, especially in local tech companies, with most of the core classes taking place after 5pm. At full capacity the program aims to have about 50 students per year. Information on the first two years of graduates is shown in Table 14.

3.5 Statistics Major

Since the time of the last review we have invested heavily in developing our major. In particular we have carried out the following steps:

- We created a three quarter sequence, STAT 340-1-2 that provides a systematic introduction to mathematical statistics.
- The major switched to competitive entry in Autumn 2013.
- We have introduced a poster presentation element into our capstone course (STAT 423). The students present at a combined poster session that includes posters created in a number of graduate classes.
- We increased the capacity of courses leading to the major. In particular, STAT 302 is now offered during every regular quarter.
- We offered a larger range of electives including two new courses *Statistical Machine Learning* (STAT 435) created by Daniela Witten, and a regular special topics course offered by Emeritus Professor Peter Guttorp[8] entitled: *So you think you can do statistics?*
- Most recently, we have developed a Data Science track within the major, designed for students who have an interest in developing computational and data management skills.
- We have taken additional steps to build up a sense of community among the undergraduate majors, including a quarterly newsletter (edited by Ranjini Grove) and providing support for students to attend JSM last year (organized by June Morita).

Admission to the Statistics Major takes place in September. Some recent data on admissions are contained in Table 16. Demand for places is two to three times the number of spaces available; with additional resources we believe that we could grow the major further.

Statistics on BS graduates are shown in Table 15. More than half of our graduating classes are female; a large fraction are also international students. Quite a lot of these international students are also double majors. A large fraction of our graduating majors (up to 90%) go on to graduate study in Statistics; those who do not often obtain Data Scientist positions in tech companies.

3.6 Statistics Minor

Each year between 5 and 10 students majoring in other disciplines obtain a Statistics Minor; see Table 17.

[8]The course is co-taught with Affiliate faculty Martin Liermann from NOAA and Ashley Steel who is now at the UN Food and Agriculture Organization (FAO).

3.7 ACMS Major

Statistics is one of the departments participating in the Applied and Computational Mathematical Sciences (ACMS) Major, which is administered jointly with the departments of Applied Mathematics, Mathematics, and Computer Science & Engineering. This major was established in 1997 and currently has approximately 160 majors enrolled (Winter Quarter 2018). The program graduated 57 students last year. The major currently offers seven options: Biological and Life Sciences; Data Sciences and Statistics; Discrete Math and Algorithms; Engineering and Physical Sciences; Mathematical Economics; Scientific Computing and Numerical Analysis; Social and Behavioral Sciences. Detailed requirements can be found here: https://acms.washington.edu/.

Two Statistics faculty serve on the ACMS Steering Committee, along with representatives from the other participating departments. Most advising for this degree program is handled by staff who also serve as advisors in Mathematics. The ACMS major has competitive admission and a limit of 200 students. Release time for the Director is currently provided by the Director's department.

Marina Meila was the most recent ACMS Director from Statistics (2015-18). Marina was the driving force behind an overhaul of the ACMS Statistics track, relaunching it in 2018 as a 'Data Science and Statistics' pathway. This has led to a large increase in enrollment: though figures for graduates this year are not yet finalized, we expect approximately 15 students to graduate in this track. Information on recent graduates and the pathways chosen are shown in Tables 18 and 19.

3.8 Undergraduate Service Teaching

At the time of our last review, the Department was teaching the following four introductory courses every quarter:

- *Basic Statistics* (STAT 220). This is a five credit, pre-calculus course using "Statistics: Concepts and Controversies", eighth edition, by Moore as the textbook. The class has about 535 students per year.
- *Elements of Statistical Methods* (STAT 311). This is also a five-credit course, on a higher level than STAT 220. It has about 600 students per year. The current text book is "Mind on Statistics", fifth edition by Utts.
- *Probability and Statistics in Engineering and Science* (STAT/MATH 390). This is a four credit, calculus level course directed mainly at Mathematics and Engineering majors. We are currently using "Applied Statistics for Engineers and Scientists" by Devore and Farnum as the textbook. It serves about 450 students per year.

- *Statistical Concepts and Methods for the Social Sciences* (STAT 221). This is a five credit, pre-calculus course modeled designed for students in the Social Sciences. This course is taught jointly with CS&SS and Sociology. It serves about 580 students per year.

We have introduced two new large classes for non-majors:

- *Introduction to Data Science* (STAT/CSE/INFO 180). This is a class modeled on the successful Data8 class at Berkeley. It was taught for the first time last year. It is offered every (regular) quarter, with Statistics, the Information School and Computer Science & Engineering each teaching the class once.

- *Introduction to Machine Learning* (STAT/CSE 416). This is a Machine Learning class for non-Majors, developed by Emily Fox, based on her successful Coursera Specialization. It was offered for the first time last year and has a target size of 120.

We expect demand for these classes to grow as students opt to take Data Science options within their degrees. The Provost has also created a Task Force with the goal of creating a Data Science Minor that will allow students in non-STEM disciplines to obtain training in Data Analysis. This expect that this will also lead to increased demand for our courses.

We run a Statistics Tutor and Study Center aimed primarily at students in our service courses and staffed by our graduate students with faculty coordination. The Center is used heavily with more than 2000 student visits during some quarters. At the time of the last review the Center was located in temporary space. Since January 2014 the Center has been housed in permanent space in Communications (opposite Padelford). Though the room lacks windows and can be a little cramped during times of high demand, it has been very helpful for the Center to be in a permanent location.

3.9 Student Credit Hours

During the last decade the student credit hours taught by faculty in the department have increased dramatically. Figure 4 shows that the number of student credit hours corresponding to students who are registered in classes with a STAT-prefix has doubled since the last review.

Figure 5 shows the number of student credit hours taught by faculty with an appointment in Statistics (excluding Adjunct appointments) and by graduate students and part-time instructors hired by Statistics. As can be seen, this figure has tripled over the last decade.

The larger credit hours associated with Statistics faculty arise in two ways: first, many of the courses offered by Statistics are cross-listed; second, approximately half of the Statistics faculty hold joint appointments and hence teach many students in other departments.

These large increases in student credit hours, combined with a reduced faculty head-count are putting considerable strain on the department and will be hard to sustain. Figure 6 shows Student Credit Hours per Tenure-Track FTE projected to AY20-21 (given retirements that have been announced and in the absence of hiring next year). The prediction assumes (conservatively) that total student credit hours in the current year and the next two years will remain at the same level as last year.

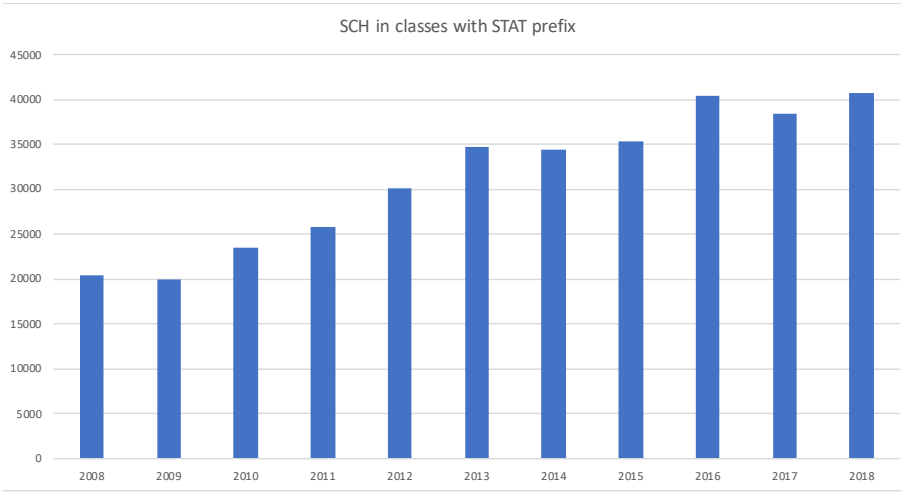

Figure 4: Student Credit Hours taught in classes with a STAT prefix (for the academic year ending in the year indicated).

3.10 Ensuring Quality of Instruction

The Department evaluates the effectiveness and quality of instruction by faculty, instructors and pre-doctoral lecturers through Student Teaching Evaluation, and peer-teaching observations by faculty.

The Department has a Collegial Teaching Evaluation Plan and a standing committee charged with implementing the plan (the Pedagogy Committee).

Every faculty member teaching in a given quarter visits one class, reviews online materials and writes a short report, pointing out strengths and weaknesses and suggesting improvements. In addition, instructors are asked to write a self-evaluation.

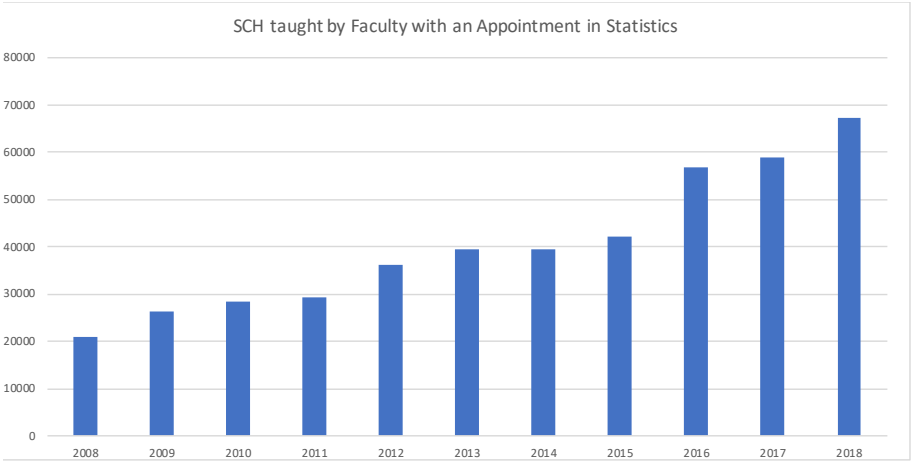

Figure 5: Student Credit Hours taught by Faculty with an appointment in Statistics together with Graduate Students and Lecturers employed by Statistics (for the academic year ending in the year indicated).

In addition, one faculty meeting slot each quarter is dedicated to discussion of techniques and listening to presentations by faculty and outside groups. Recent presenters have included: the Office for Community Standards & Student Conduct; Disabled Student Services; a faculty member from Biostatistics describing his experience using Active Learning techniques.

4 Scholarly Impact

Our faculty have a high-profile both nationally and internationally. Here are a few recent highlights:

- Professor Mathias Drton was an IMS Medallion lecturer in 2014;
- In 2013 Professor Elena Erosheva and co-authors received the Mitchell Award of the ASA/ISBA;
- In 2017 Associate Professor Emily Fox received a PECASE Award from President Obama;
- Associate Professor Sham Kakade co-led a team that won a prestigious NSF TRIPODS award to establish the UW Institute on the Algorithmic Foundations of Data Science;

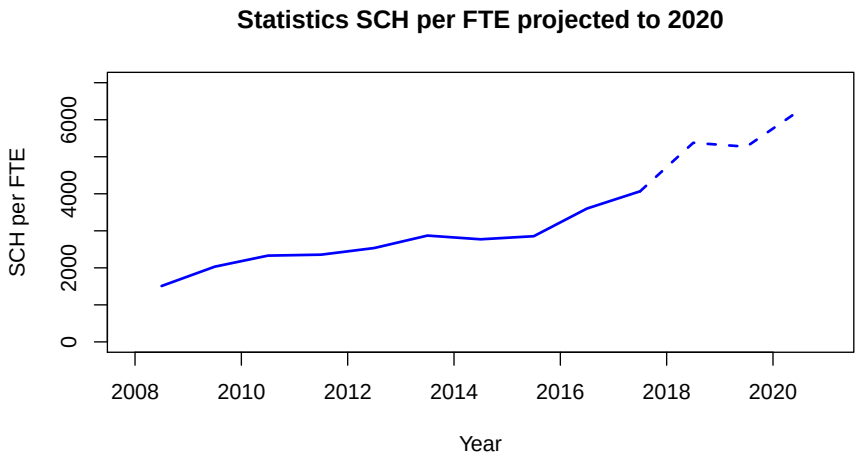

Figure 6: Student Credits Hours per Tenure-Track Faculty FTE to 2020. The projection in the case of no hire in AY19-20, assuming that total SCH in AY18-19 and the following two years remain at the same level as in AY17-18. (In reality, demand for Data Science tracks will likely lead to increased SCH.)

- In 2017 Professor Adrian Raftery was awarded the St. Patrick's Day Medal by Science Foundation Ireland;
- Emeritus Professor Elizabeth Thompson was President of the International Biometric Society (2016-17);
- In 2018 Professor Jon Wakefield was appointed to the UN Child Mortality Advisory Group
- Professor Jon Wellner was President of the Institute for Mathematical Statistics (2016-17);
- Professor Daniela Witten received the NIH Director's Early Independence Award (2011-2016).

As a department we also have strong links with many other R1 Universities. For example we have recently established doctoral exchange agreements with the University of Oxford and the University of Lancaster in the UK.

4.1 Faculty Research Areas

Causal Inference

Causal models describe how effects would change had treatments been different. Research in this field provides precise answers to questions such as: *How do conclusions drawn from randomized vs. observational studies differ? How can the results from an observational study be strengthened by controlling for baseline covariates? How should such adjustment be performed in longitudinal settings where treatments are assigned at multiple time-points? How should direct and indirect effects be defined and inferred?*

Thomas Richardson has worked on Bayesian methods for instrumental variable models. He has also helped to unify the potential outcome approach, that is widespread in Economics and Biostatistics, with graphical approaches used in Artificial Intelligence and Epidemiology.

Mathias Drton has worked on criteria to decide identifiability of causal effects in multivariate linear causal models. More recently, he has developed algorithms for inference of causal structure from high-dimensional data and data subject to latent confounding.

Alex Luedtke has developed semi-parametric methods for estimating optimal dynamic treatment regimes, as well as approaches for incorporating machine learning procedures into semi-parametric estimators for causal and other estimands. He is also developing estimation strategies for data arising from trial designs that are tailored to enable the estimation of vaccine efficacy conditional on the (possibly unobserved) immune response that a trial participant would have had if they had been randomized to receive the vaccine. These methods will be used to estimate vaccine efficacy in three ongoing HIV vaccine efficacy trials.

Ema Perković has given a sound and complete graphical characterization of the situations in which the back-door adjustment formula (aka standardization) will consistently estimate a causal effect, including in situations with unmeasured confounding and (with additional assumptions) unknown structure.

Demography

Over the past 10 years, the department has been very actively engaged in demography, the quantitative measurement of aspects of human populations. Much of this work has been in close collaboration with UN agencies, and also with the UW Center for Studies in Demography and Ecology (CSDE).

Adrian Raftery has collaborated with the UN in an NIH-funded project to develop new statistical methods for probabilistic projections of future mortality, fertility, international migration and population. These were adopted by the UN as the

basis for their official population projections for all countries in 2015. One conclusion is that world population is likely to grow more than previously expected. Raftery has also developed new methods for estimating and forecasting international migration flows.

Jon Wakefield has developed new statistical methods for estimating under-five mortality in space and time in a developing world context. With Tyler McCormick, he also developed a new system for monitoring mortality using innovative sampling and estimation methods that are likely to be particularly useful for countries without good vital registration systems.

Adrian Dobra has pioneered new statistical methods for estimating internal migration using mobile phone and other data. These include new methods for measuring human mobility using mobile phone records enhanced with GIS data, methods for detecting unusual human population behavior in space and time using mobile phone data and methods for measuring human activity spaces with density ranking based on GPS data. Dobra has also developed new methods for studying the relationship between internal migration and HIV acquisition, with an emphasis on South Africa.

Tyler McCormick has developed new methods for using Twitter and other social media data for demographic research. He has also developed new methods for assigning causes of death probabilistically using verbal autopsies. In addition, he developed new statistical methods for estimating demographic profiles in at-risk populations that are hard to observe directly.

High-Dimensional Statistics and Geometric Data Analysis

The massive amounts of very high-dimensional and noisy data being continuously produced call for novel methods to unveil the hidden information beneath. High dimensional statistics focuses on analyzing data with the number of dimensions comparable to, or even larger than, the available sample size. Once allowing for the dimension to be this high, we face a paradigm shift from both methodological and theoretical perspectives, coupled with demands in applied probability and optimization. The department has Chen, Dobra, Drton, Fox, Han, Meila, and Witten all actively working in this area. Research focuses on computation, inference, and theory for high-dimensional complex data.

As the data collected spans more areas of human interests, its statistical analysis must be tailored not only to the increased dimension but also to its *geometric structure*. For instance, high dimensional data may lie along curves or surfaces, or may separate into *clusters*. Often times, the structure itself is the object of the analysis and discovery. Clustering is the problem of finding groups in data; the department has a long tradition in this area, involving Stuetzle, Raftery, Meila (recently jointly

with Harchaoui), Chen; they attack aspects of clustering from algorithms to theoretical foundations. *Manifold estimation* is pursued by Meila, Chen. *Topological data analysis*, concerned with finding discrete structure beyond clusters, such as loops and hollows, and other *complexes*, is studied by Chen. Bookstein studies *morphometrics*, the analysis of form in biometrics.

Notable contributions to open source software are the `megaman` python package, for manifold learning with millions of points, and the `MClust` R package which is one of the top 1% of all R packages. Adjuncts and affiliates active in this area include Fan, Fazel, Narayanan, Sadinle, Shojaie and Willis.

Networks

Our connections with each other fundamentally shape our opportunities and lived experience. Social network analysis attempts to distill and quantify the role these connections play in our lives. Research in this area is challenging because data are both complex and expensive to obtain. Network data consists of the links (e.g. friendship, giving a loan, referring for a job) between all individuals. Complexity arises because the likelihood of connection between two people depends on the other connections in the network. Further, collecting data is costly because it requires enumerating ties between all individuals. In response, researchers often analyze the same small number of datasets or use more readily available proxies (e.g. social media data) that only partially capture relationships of scientific interest.

UW researchers have developed and refined methods to represent the high dimensional dependence structure in both static and dynamic networks using low dimensional geometric spaces or small sets of statistics on the graph, continuing a two-decade long legacy of innovation in this area at UW. UW has also played a major role in new theoretical foundations that scale models to massive networks where the likelihood of connections between individuals is small, along with developing models for community detection with guarantees for recovery with and without model assumptions. Further innovations come in developing sampling strategies to recover information about networks at lower costs, and using networks to reach individuals difficult to access using other data collection strategies. Faculty in this area include Adrian Dobra, Elena Erosheva, Emily Fox, Tyler McCormick, Marina Meila, Martina Morris, Adrian Raftery, Ali Shojaie (Adjunct) and Daniela Witten.

Optimization and Simulation Methods

Recent advances in many areas of statistics were driven by progress in fast numerical optimization algorithms for maximizing (penalized) likelihood objectives

(or minimizing regularized/constrained empirical risk objectives) for large-scale problems and fast Monte-Carlo simulation algorithms or integration algorithms for approximating high-dimensional complex distributions.

Raftery has developed new computational methods for Bayesian model averaging in high-dimensional spaces, as well as more efficient versions of Bayesian additive regression trees (BART-BMA). He also developed new adaptive incremental Markov chain Monte Carlo algorithms for complex inference problems. In addition, he has developed methods for fast inference in latent space network models using an approximate case-control likelihood. Wakefield developed MCMC algorithms for space-time models that use integrated nested Laplace approximations (INLA) to evaluate normalizing constants or provide approximate conditional posterior distributions from which samples can be drawn. Witten developed a dynamic programming algorithm that can be used to deconvolve neuronal fluorescence traces. McCormick investigated the statistical properties of variational inference and the Expectation Conditional Maximization algorithm for high dimensional Gaussian & Gaussian copula graphical models. Chen studied the problem of using an importance sampler under a stochastic simulated model and designed a two stage estimator that consists of an exploration phase and an exploiting phase. Luedtke studied adversarial training strategies to learn minimax optimal statistical procedures. Harchaoui designed generic acceleration schemes to accelerate gradient-based algorithms for large-scale convex and non-convex optimization problems in statistical machine learning. Kakade developed stochastic approximation algorithms for statistical machine learning, including algorithms to escape saddle points efficiently.

Social science

Social science is a major research area for the department, with much work being carried out in collaboration with social scientists both at UW and elsewhere. Much of this collaboration is promoted by the UW Center for Statistics and the Social Sciences (CSSS), which has been a major departmental initiative over the past 20 years. Faculty are involved in research in economics, criminology and psychology, as well as social aspects of demography and network analysis.

Elena Erosheva works on statistical methodology for criminology and developmental psychology. She has developed new statistical models for criminal careers. These are based on flexible functional forms, and have to some extent superseded the older latent class models. She also works on the statistical analysis of disability, developing models for multivariate binary data. She has also analyzed and extended mixed membership models, and applied them to the estimation of diagnostic error and the classification of scientific articles in PNAS.

Tyler McCormick has worked on the development of model-based clustering methods for mixed data, with application to clustering South African households based on their assets. He has also worked on inferring social structure from continuous-time interaction data. He has also analyzed racial inequalities in social connectedness to prisoners.

Thomas Richardson has also worked on the relationship between early-life socioeconomic conditions and birth outcomes, using the grandmother's education and the grandchild's birth weight.

Statistical Machine Learning

Modern statistical machine learning approaches, along with increased computational resources and larger datasets, underlie many of the recent advances in areas of science such as genomics, neuroscience, social sciences, and ocean sciences. Equally important is that many of these machine learning algorithms, trained on gigantic datasets, are resulting in technological breakthroughs, e.g. in computer vision and natural language processing, and thus impacting society more broadly, through progress in e.g. computational biology and personalized medicine.

Witten's research involves the development of flexible methods for graphical modeling, new approaches for unsupervised analysis of multi-view data (i.e. data in which a single set of observations have measurements on multiple sets of features), and non-parametric regression. McCormick's research consists in building interpretable predictive models for large-scale health-care and infrastructure problems. Harchaoui's research develops scalable methods for statistical prediction and inference from large datasets, with applications to astrostatistics, computer vision, marine microbiology, and music analysis. Kakade's research designs provable and practical statistically and computationally efficient algorithms, for faster large scale convex and nonconvex optimization (including how to escape from saddle points efficiently) and for estimation of latent variable models (including latent Dirichlet allocation and overlapping communities in social networks).

Statistics for the physical and environmental sciences

Contributing to the physical sciences has been a long-standing tradition with the Statistics faculty. Chen has been collaborating with astronomers at Carnegie-Mellon University, UC Berkeley, the Flatiron Institute and Academia Sinica for 6 years. Chen is a member of the LSST Statistics and Informatics team and of the Astro-Statistics Interest Group of the American Statistical Association. Chen's main collaborative project concerns finding the cosmic web structures inside our Universe and testing related astrophysical theories. Meila is collaborating with

UW astronomers on modeling spectra of galaxies.

Meila is working with several teams of chemists at UW (Beck, Hillhouse, Pfaendtner) and abroad (Tkatchenko) to leverage machine learning methods for the discovery of photovoltaic materials, and for understanding the properties of molecules and materials by unsupervised learning methods.

Raftery has been collaborating intensively with members of the UW Atmospheric Sciences Department over the past 15 years. The first calibrated ensemble-based probabilistic forecasting method of temperature and amount of precipitation (with Mass and former Statistics faculty Gneiting) has been among the five most cited articles in Meteorology published since 2005. More recently, Raftery has extended the methods to a wide range of outcomes, including humidity, visibility, and mountain pass de-icing decisions. He worked with Atmos Professor Frierson on probabilistic forecasts of carbon emissions and global temperature change. With Atmos Professor Bitz he is studying the statistical post-processing of sea-ice forecasts. Guttorp's work on climate modeling includes statistical up- and downscaling of models, comparison to data, bias correction, and the uncertainty on ranking of hottest years (employed by NOAA).

Adjunct and affiliate faculty include Marzban, Percival, Sevčikova.

Statistical Theory

Statistical theory concerns the properties of a statistical procedure via a probability model. Research in statistical theory provides probability statements and guarantees on the properties of various data analysis tools. A major topic in statistical theory is the large-sample properties of statistical estimators, including the limiting distribution, convergence rate, concentration of probability, and minimax theory. Our department consists of several members working on statistical theory. Chen focused on developing theory for set estimation problems and nonparametric approaches. Drton is an expert in graphical model theory and algebraic statistics and is an author of the book *Lectures on Algebraic Statistics* (with B. Sturmfels and S. Sullivant). Han worked on various theoretical problems including empirical process theory, random matrix theory, and theory for nonparametric and high-dimensional problems. Perlman developed many fundamental theories in graphical models and statistical testing methods. Wellner is a leading expert in empirical process theory and shape-constrained inference. He is an author of several famous textbooks, including *Empirical Processes with Applications to Statistics* (with G. R. Shorack) and *Weak Convergence and Empirical Processes, With Applications to Statistics* (with A. W. van der Vaart). Adjuncts, Affiliates and Emeritus faculty members active in this area include Burdzy, Fan, Mason, Rudas and Shorack.

4.2 Student Research and Impact

We are proud of the accomplishments of our PhD students, which reflect both their hard work and talent, but also the education, training and inspiration that they have received both from faculty and their peers during their time at UW. We include below a selected list of alumni from the last 10 years; a complete list of alumni is given here https://stat.uw.edu/personnel/alumni/.

James McLean Sloughter (PhD 2009) did his dissertation with Raftery and affiliate professor Gneiting on probabilistic weather forecasting. His is now a tenured Associate Professor of Mathematics at Seattle University.

Alex Lenkoski (PhD 2009) did his PhD work with Dobra on graphical models. From 2010-2012 he was a Postdoctoral Fellow at the University of Heidelberg, Germany. In 2013 he moved to the Norwegian Computing Center, Norway where he is Chief Research Scientist.

William Kleiber (PhD 2010) did his dissertation with Raftery and affiliate professor Gneiting on geostatistics. He is now an Assistant Professor of Applied Mathematics at the University of Colorado.

Robin Evans (PhD 2011) did his thesis work with Richardson on log-linear graphical models. He was a Postdoctoral Research Fellow at the Statistical Laboratory in Cambridge, UK from 2011 to 2013. He is now an Associate Professor in Statistics at Oxford, UK and also a fellow of Jesus College.

Le Bao (PhD 2011) did his dissertation with Raftery on statistical models for the HIV/AIDS epidemic. He is now a tenured Associate Professor of Statistics at Penn State University.

Julia Palacios (PhD 2013) did her dissertation work with Minin on methodological development of Bayesian nonparametric inference of evolutionary parameters from DNA sequence data from a single non-recombining locus. She subsequently carried out post-doctoral research at Harvard and Brown, and is now an Assistant Professor in the Departments of Statistics and Biomedical Data Science at Stanford University.

Ryan Kappedal (PhD 2014) advised by Marina Meila, did his thesis work in solving the gravimetric inverse problem by compressed sensing. He is an Active Duty, Lieutenant Colonel in the United States Air Force and Adjunct Assistant Professor of Statistics at the Air Force Institute of Technology. He also serves as a Senior Product Manager for Artificial Intelligence and Machine Learning systems at Defense Innovation Unit in Mountain View, California.

Charles Doss (PhD 2013) did his thesis work with Wellner on inference for the mode of a log-concave density. He is an Assistant Professor of Statistics at the University of Minnesota.

Mark C. Wheldon (PhD 2013) did his dissertation with Raftery on Bayesian population reconstruction. He was an Assistant Professor (Lecturer) in Biostatistics at Auckland University of Technology from 2013 to 2016. He is now a Statistician at the United Nations Population Division.

Theresa Smith (PhD 2014) did her PhD work with Dobra and Wakefield on graphical models and spatial epidemiology. From 2014-2016 she was a Senior Research Associate at Lancaster University, UK. Since 2016 she is a Lecturer (equivalent to Assistant Professor) in the Department of Mathematical Sciences, University of Bath, UK.

Dennis Leung (PhD 2016) did his thesis work with Drton on problems in multivariate statistics. He was a Postdoctoral Research Fellow at the Chinese University of Hong Kong and the University of Southern California from 2016 to 2019. He will start an Assistant Professorship at the University of Melbourne.

Andrew McDavid (PhD 2016) did his thesis work with Drton and Gottardo on problems in the analysis of single-cell gene expression data. He is an Assistant Professor of Biostatistics at the University of Rochester.

Laina Mercer (PhD, 2016) wrote her thesis on "Space-Time Smoothing Models for Surveillance and Complex Survey Data." She initially worked at the Institute for Disease Modeling, a Gates funded organization, where she researched polio and reproductive health. She has recently joined the international global health organization, PATH.

Luca Weihs (PhD 2018) did his thesis work with Drton on identifiability criteria for causal models and on measures of dependence. He is now a Postdoctoral Research Fellow at the Allen Institute for Artificial Intelligence.

Ted Westling (PhD 2018) did his thesis work with Carone on nonparametric inference for general monotone functions. He is currently a Postdoctoral Fellow in the Center for Causal Inference at the University of Pennsylvania, and will soon be joining the Department of Mathematics and Statistics of the University of Massachusetts at Amherst as an Assistant Professor.

Qiyang (Roy) Han (PhD 2018) did his work with Wellner on shape-constrained statistical inference and on multiplier inequalities for empirical processes with applications to rates of convergence of nonparametric least squares estimators. He is an Assistant Professor at Rutgers University.

Statistics faculty also advise a number of PhD students in other departments, particularly in Biostatistics. Again this is an incomplete list:

Takumi Saegusa (Biostatistics PhD 2012) did thesis work with Wellner on weighted likelihood methods for two-phase sampling. He was a postdoctoral fellow at the University of Washington and Fred Hutchinson Cancer Research Center

from 2012 to 2015. He is currently an Assistant Professor at the University of Maryland.

Kean Ming Tan (Biostatistics PhD 2015) completed his dissertation work, under the supervision of Witten, on clustering and graphical modeling in high dimensions. From 2015-2017 he was a post-doctoral researcher with Han Liu at Princeton University. Since 2017 he is an Assistant Professor in the Department of Statistics at University of Michigan.

Linbo Wang (Biostatistics PhD 2016) did his thesis work with Richardson and Zhou on the causal analysis of ordinal treatments under truncation by death. He was a Postdoctoral Fellow in the Harvard Causal Inference Program. Since 2018 he has been an Assistant Professor at the University of Toronto.

Ashley Petersen (Biostatistics PhD 2016) completed her dissertation work, under the supervision of Witten and Simon, on flexible and interpretable regression modeling. Since 2017, she is an Assistant Professor in the Department of Biostatistics at University of Minnesota.

Shizhe Chen (Biostatistics PhD 2016) completed his dissertation work under the supervision of Witten and Shojaie, on graphical modeling in a variety of non-traditional settings. From 2016-2018 he was a post-doctoral researcher with Paninski at Columbia University. Since 2018, he is an Assistant Professor in the Department of Statistics at UC Davis.

4.3 Postdoctoral Fellows

While post-doctoral fellowships are still relatively new in the field of statistics, they are becoming more common, and the department has had a number of post-docs in recent years. Post-doc funding has come from a number of sources. Some post-docs have been self-supported on NSF Postdoctoral Fellowships or eScience Postdoctoral Fellowships, whereas others have been supported on faculty research grants. In some cases, post-docs have been partially supported by the department in exchange for teaching or as part of faculty start-up packages.

Post-docs are an integral part of the department. They have offices in Padelford near the students and faculty, and their attendance at department seminars and participation in department social events is welcomed.

A number of recent post-docs currently serve as faculty at other institutions. For instance, Alexander Franks is an Assistant Professor at University of California, Santa Barbara; Nehemy Lim is a Visiting Assistant Professor at University of Connecticut; Geir-Arne Fuglstad is an Associate Professor in the Department of Mathematical Sciences at NTNU in Trondheim, Norway; Adrien Saumard is an Assistant Professor at ENSAI/CREST in Bruz, France; Tsuyoshi Kunihama is an Assistant Professor at Kwansei Gakuin University; and Michelle Ross was for-

merly an Assistant Professor at University of Pennsylvania. A number of other post-docs have gone on to research positions in industry; among others, Nick Foti is machine learning researcher at Apple, and S. Mackay Kurtis is a Senior Principal in Decision Science at the Walt Disney Company.

5 Future Directions and Hiring

As this report shows, the department has greatly increased its level of activity and teaching over the last ten years. At the same time, in the last four years, owing to departures, retirements and faculty moving their lines, full-time FTE has reduced from 15.25 (in 2016) to no more than 10.25 (at the start of 2020) without hiring next year. This does not provide sufficient senior faculty to continue running our operations, nor qualified instructors to teach our courses; see Figure 6. The following are some of our highest priorities:

- Statistics needs to try to hire 1-2 faculty per year for the next 5 years.
- At least one and possibly two hires need to be at the Full Professor level, partly in order to take on administrative responsibilities within the department.
- The department requests a Professor of Practice position for the Director of our Consulting Program. This program is currently run by Michele Shaffer who is a Part-Time Lecturer in Statistics and was previously an Associate Professor (WOT) in UW Pediatrics.

5.1 Hiring Priorities

Some of the areas in which the department currently has insufficient coverage include:

- Applied Methodology
- Bayesian Statistics
- Environmental Sciences
- Spatial Statistics
- Time-Series Analysis

We are also excited about partnering with non-STEM units to recruit high-quality joint faculty under the auspices of the Provost's new Data Science Initiative. The Department has a long track record of faculty constructing bridges to new areas and conducting innovative inter-disciplinary research. In particular, we have joint appointments with the School of Nursing, the School of Social Work and Sociology (3).

Since there are typically not huge numbers of applicants for academic jobs in Statistics, all else equal, the Department prefers to carry out open searches and then look for applicants who are outstanding and a good fit in terms of areas of research and expertise, rather than having a more narrowly tailored search.

6 Self-Study Questions

6.1 How to respond to growth in demand?

As a discipline, Statistics is undergoing a period of growth. There is strong demand for Statistics degrees, and there are many job openings for Statisticians. In the last 10 years the Department has successfully started an M.S. degree in Statistics and (together with other departments) an M.S. in Data Science. Applications for these degrees far outstrip the number of spaces available (500 applications for the Statistics MS for 20 places). Our major has grown and we have launched several new major service classes in Machine Learning and Data Science. At the same time Statistics faculty numbers have dropped (FTE: 14.4 in 2008; at most 13 in 2018).

How should we or can we address this demand? Should we grow our Major? Or should we add additional fee-paying MS students?

Answer: Our most immediate options here are to increase one of our existing programs: our Major, the Full-Time MS, the Data Science MS, or our PhD. Expanding or re-working our Part-Time or Concurrent MS degrees would be another possibility.

We consider each of these in turn:

Undergraduate degree: There is definitely demand (see Table 16) and we have reason to believe that there are qualified applicants who are not currently admitted. A moderate expansion of our program (e.g. admitting 50-60 per year) is readily achievable. Expansion beyond that size would likely change the student experience.

Full-Time MS degree: Expansion here is limited by the classes such as 512-3 and 570-1 that are shared with the Statistics and Biostatistics PhD programs. It is hard to see much additional growth being possible without having additional

offerings of these classes. This would require additional faculty. An alternative would be to separate the MS degree from the PhD. This is a strategy that has been pursued by Applied Mathematics.

Data Science MS degree: An increase in the Data Science MS would require the agreement of all the other units involved. In addition, this degree has already grown a great deal since it was started two years ago.

PhD degree: Some expansion of our PhD degree is probably possible, for example aiming to admit 12 students every year. Since we guarantee students 5 years of funding, we have often been conservative in terms of admission numbers. Indeed, during the Fall Quarter we are often scrambling to find slots for our new students. However, in Winter and Spring Quarters this situation turns around and we often end up having to hire students from other departments in order to fill our TA slots. Large scale expansion of the PhD would not be feasible with our current faculty numbers.

6.2 Is the College of Arts & Sciences the best location for Statistics?

In the near to medium term the College of Arts and Sciences is in a period of contraction and retrenchment. Retiring faculty are not being replaced. Since four faculty will retire by Summer 2020, this directly impacts the department.

In other universities the discipline of Statistics is not always located in Arts and Sciences. For example, at UC Irvine it is within the Bren School of Information and Computer Sciences; at UC Santa Cruz it is within the Baskin College of Engineering; at University of Pennsylvania it is in the Wharton Business School.

Should Statistics remain within the College of Arts and Sciences at the University of Washington?

Answer: The College has seen shrinking revenues due to three factors:

(1) The legislature restricting increases in tuition; (2) Falling enrollments and student-credit hours in many parts of the College and faster growth elsewhere on campus; (3) the introduction of Activity-Based Budgeting (ABB).

To address this, the College has implemented a *de facto* policy whereby out of every two faculty retirements or departures, only one is replaced. This policy makes no allowance for differential rates of attrition owing to: (a) faculty from academically stronger units being more likely to be recruited externally; (b) retirements being clustered, for example, as in the case of Statistics, 40 years after the department was founded; (c) the fact that a reduction of 1 or 2 faculty lines represents a much larger fraction of the faculty in a small department than in a larger one. It also makes no allowance for academic excellence nor does it reflect increases in student credit hours at the department level.

More fundamentally, the reductions in enrollments have been seen by the College leadership as an existential threat to the liberal arts, requiring a major effort to re-structure and re-brand these degrees. This is natural, since the College cannot cut tenured faculty from departments in which demand has fallen. (For example, the College proposed a new admission system as a means of trying to boost enrollments in the liberal arts.) However, this effort places STEM disciplines within the College, such as Statistics, in a difficult position since they are viewed as being responsible (albeit indirectly) for this state of affairs.

As a simple manifestation of this, in the Fall of Autumn 2018, the College proposed a new Data Science initiative seeking to train non-STEM students in Data Analysis. The initial proposal that was sent to the legislature requested faculty lines in Geography, Political Science, Sociology, English, Linguistics, Digital Arts, and History. However, it did not mention Statistics at any point in the proposal. The Provost has now set up a task-force to implement this initiative on which Statistics is represented by Tyler McCormick.

During the same period Statistics has been undergoing rapid growth in many other universities. For example, Yale has doubled the size of its department within the last 5 years. CMU has also grown considerably.

The Department is a net-generator of ABB revenue; it is also able to create revenue via fee-based programs. However, the scale of the financial problems in the College will not be addressed by any amount of growth that the department can feasibly achieve on its own.

Under these circumstances, it is natural to ask whether the Department should seek to move to another College where it would have more opportunities for growth (or at least might avoid shrinking further). The College of Engineering and the Information School are two possibilities. We have had exploratory talks with Anind Dey, the Dean of the Information School.

6.3 Joint Appointments: Challenges and Opportunities.

Approximately half of the current faculty are joint, and this proportion seems likely to grow, at least in the short-run, since two faculty who are not joint will retire at the end of AY19-20. What challenges and opportunities does this raise?

The Department has always seen inter-disciplinary work as fundamental to its mission. We currently have joint appointments with Biostatistics (5),[9] Computer Science & Engineering (2), School of Nursing (1), School of Social Work (1), Sociology (3). It is a clear part of the UW Statistics brand.

[9] In addition to Jon Wakefield and Daniela Witten who are 50/50, this includes Tom Fleming and Dick Kronmal who are 0% in Statistics and Jon Wellner who is 0% in Biostatistics.

	Non-Joint	Joint	All
No. attending $\geq 70\%$ of meetings	11	5	16
No. attending $< 70\%$ of meetings	1	5	6
Total	12	10	22

Notes: Meetings where faculty were on sabbatical or on unpaid, maternity or sick leave are not counted. Telephone or video-conference participation is counted as 0.5. Faculty are counted as 'Joint' if their regular teaching load is 2 or fewer courses for Statistics per year. Emeritus faculty and 0% appointments are not included.

Table 1: Faculty meeting attendance since September 2017 at which a faculty was eligible to vote.

This alignment is also of great benefit to the campus as a whole: as inspection of Figures 4 and 5 shows, approximately 40% of the student credit hours taught by our faculty are to students taking classes in other departments.

However, owing to the retirement of faculty, most of whom are not joint, the department is approaching a stage where approximately half the faculty are joint. Furthermore, five of our joint faculty teach one course per year for Statistics as their regular load (whereas a regular load is four courses).

Since joint faculty have obligations in more than one unit it is not surprising that a number do not participate in activities such as faculty meetings or seminars as consistently as faculty who are not joint; see Table 1 and Figure 7 for data on recent faculty meeting attendance in Statistics. Note that half of the joint faculty *do* attend meetings regularly and indeed almost certainly attend *more* meetings in total (than their non-joint colleagues) since they also attend meetings in their other department.

Joint faculty are often involved in collaborative ventures with other universities and organizations which means that they are around less. The consequence of this is that it can be harder to build a sense of community and also to build a consensus regarding the best way forward in important decisions that require discussion over multiple meetings.

At the same time, as a Department we view ourselves as a central hub for statistical research and education on campus. Consequently, we are very excited about the prospects for recruiting joint faculty as part of the Provost's Data Science Initiative.

6.4 Calculation of Teaching Loads

Teaching loads within the Department are calculated in units of courses; the standard load being 4. There is no differentiation for the number of credits or the

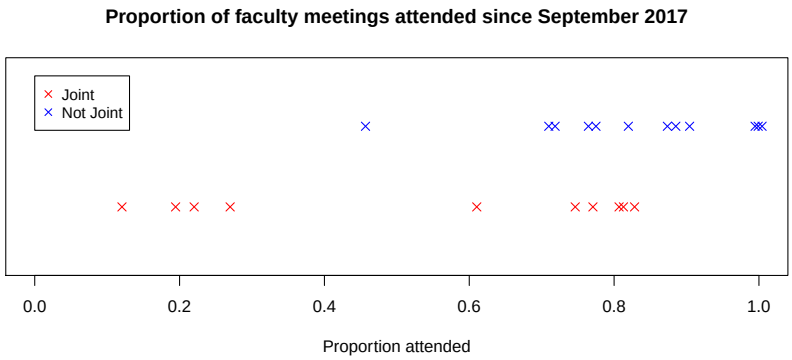

Figure 7: Faculty meeting attendance since September 2017 at which a faculty member was eligible to vote. See Table 1 for additional details.

number of students. In other departments, e.g. in the UW Department of Mathematics, finer distinctions are made. In addition, graduating PhD students, and major service contributions are counted against a faculty member's teaching load.

What are the advantages and disadvantages in such an 'arithmetical' system for assigning loads?

Answer: The system used by Mathematics assigns teaching for full-time tenure-track faculty using an arbitrary unit called a "teaching credit". The amount of credit assigned to courses varies from 0.85 for a large undergraduate calculus course to 0.75 for 400-level and 500-level classes, to 0.65 for smaller 300-level classes.

The average amount of teaching by faculty in year t is declared to be the required teaching load in year $t+1$. Currently this is 3.37. Faculty receive 0.1 credit for each PhD student when they pass the general exam and 0.4 credit when they pass the final. In addition, some credit is assigned for jobs such as: directing graduate admissions, graduate program coordinator etc., Faculty are allowed to run small deficits or surpluses from one year to the next. Buyout is handled in the usual way.

Advantages:

- The system provides credit for advising PhD students.
- Weighting courses differentially provides incentives for teaching classes that might otherwise be unattractive. (In Mathematics it has led to many more Full Professors teaching the introductory calculus sequence.)

- The system allows faculty to receive credit less than a full course reduction for smaller service tasks. For example, in Statistics this could provide a way to reward faculty who participate in exam activities during the summer. At present faculty volunteer for service tasks and receive no credit as such.

Disadvantages:

- The assignment of weights to classes is somewhat arbitrary and could be a source of controversy.
- There are existing MOUs with Biostatistics, CSSS, CSE and eScience relating to teaching responsibilities that might need to be revisited.

Though faculty felt that, owing to differences between the Mathematics and Statistics Departments, such a system would have to be modified, there was a consensus that it would be useful to weight classes and to allow partial credit to be assigned for advising PhD students and performing other service duties.

A Organizational Structure

Figure 8 shows the organizational structure of the Statistics staff and administrative faculty.

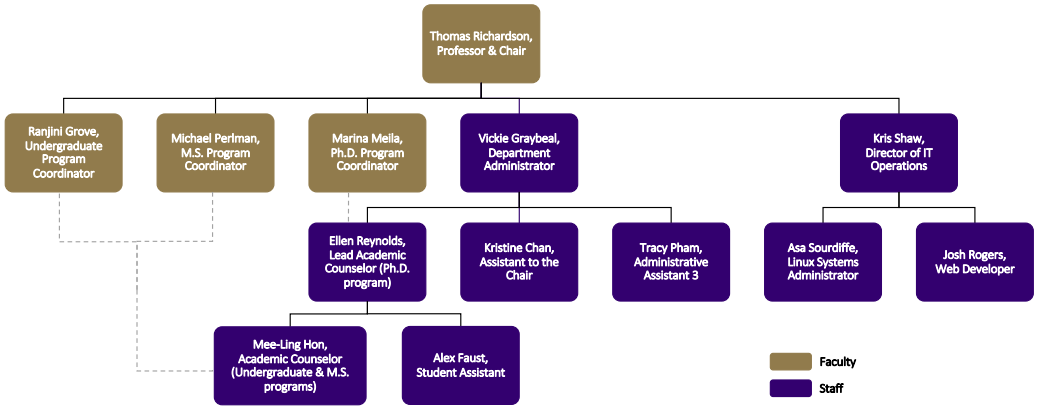

Figure 8: Organizational Structure of the Department.

B Budget Information

The State of Washington has a biennial budget cycle, enacting two-year budgets that begin on July 1 of each odd-numbered year and end two years later on June 30. Tables 2 and 3 summarize the Department of Statistics' budgets for the biennia that ended on June 30, 2015, and June 30, 2017. Table 4 summarizes the current biennium through 2/28/2019. The university's General Operating Fund, or GOF, is a combination of the funds allocated by the state and those obtained through the operating fee portion of student tuition. This is the core of our instructional budget. The university's Designated Operating Fund, or DOF, represents money obtained from Summer Quarter revenue, miscellaneous fees, and assorted other sources. A modest portion of our budget is allocated by the College as DOF. The other principal sources of funding are our indirect cost returns from grants (Research Cost Recovery, or RCR),[10] fee-based program budgets, non-UW course fees, direct gifts to departmental funds such as Friends of Statistics, and income earned from our endowments.

[10]RCR is sometimes included with DOF, but we list it separately here, since it is funding that is generated via grant activity.

GOF budgets must be spent in full during a given biennium. They cannot be carried over. Other budgets carry over beyond the end of a biennium. This makes it a bit of a challenge to decide when to take a snapshot of our budget within a biennium. Tables 2-4 list biennial end dates, but the GOF budget numbers shown are the totals allocated for the given biennium. We have divided GOF into seven categories: 1) faculty salaries, 2) teaching assistant salaries, 3) research assistant salaries, 4) staff salaries (professional and classified), 5) hourly salaries (Graders, Tutors and Emeritus faculty teaching), 6) operations, and 7) benefits. As the main purpose of GOF funds are to further the teaching mission of the University, operations support is extremely minimal under this budget category.

Much of the DOF budget consists of funds allocated to us by the College as their portion of start-up agreements for new faculty and faculty retention agreements. The number listed in the table is the budgeted amount for the biennium. Likewise, the number listed as RCR is the budgeted amount for the biennium. Both the biennium budgeted amounts for the DOF and RCR contain carry-forward funds or deficits from the previous biennium plus new money. The majority of the RCR funds are used to pay staff salaries and NIH grant salary cap commitments.

The Statistics faculty are very successful in their research programs which provide multiple collaborations across campus. Total research awards by biennium are included in Tables 2-4. These research awards provide funding for faculty summer salaries, course buyouts, travel, and graduate student research appointments.

The department participates in two fee-based Master of Science programs ("Master's in Statistics – Advanced Methods and Data Analysis" and the "Data Science Master's" programs). These programs have been a significant source of revenue for the department. Tables 2-4 show the remaining budget balances at the end of each biennium. These balances are transferred to the department main revenue budget at the end of each fiscal year to be used for department general support.

There are two revenue budgets within the department. As mentioned in the previous paragraph, remaining balances at the end of each fiscal year are transferred from our fee based budgets into our main department revenue budget to be used for department general support and operations. The other revenue budget receives course fees from non-UW courses that faculty have developed such as through Coursera. The amounts reflected in the tables do not include the fee-based budget transfers as they are already reflected in the fee-based budget lines. The amounts reflected in Tables 2-4 are from A&S transfers and non-UW course fees collected.

July 1, 2013 – June 30, 2015	
Category	**Amount**
GOF budget - Faculty Salaries *(biennium total)*	$3,050,279
GOF budget - TA Salaries *(biennium total)*	$430,589
GOF budget – RA Salaries *(biennium total)*	$57,011
GOF budget - Staff Salaries *(biennium total)*	$695,773
GOF budget – Hourly Salaries *(biennium total)*	$27,993
GOF budget - Operations *(biennium total)*	$29,734
GOF budget - Benefits *(biennium total)*	$1,042,314
DOF budget – *(biennium total)*	$64,088
RCR budget – *(biennium total)*	$332,993
Research Awards *(7/1/13 – 6/30/15)*	$4,014,243
Fee-Based budgets *(7/1/13 - 6/30/15)*	$570,182
Revenue budgets *(7/1/13 - 6/30/15)*	$62,716
Non-Endowment Gift Budgets	$35,266
Endowment Operating Funds - Professorships	$0
Endowment Operating Funds - Graduate Fellowships	$40,647
Total	**$10,453,828**

Table 2: Budget information for the 2013-15 Biennium.

The non-endowment gift budget balances wax and wane with the arrival of gifts and their use to support departmental programs. The numbers listed, once again, represent the figures at the end of each biennium. This is the case as well for the endowment operating funds, much of which are encumbered for such items as graduate fellowships to incoming students and professorship expenses.

The current budget is summarized in Table 4. It does not match up smoothly with the budgets for the previous biennia, since there are four months remaining in the biennium and current fiscal year.

A summary of our endowments can be found in Table 5. All endowment gifts are invested in the university's Consolidated Endowment Fund, whose value is calculated four times annually, on the first day of each quarter. Thus, the amounts listed in the tables are out of phase. We list the market values on the last days of the previous two biennia and as of January 1, 2019 for the last table.

July 1, 2015 – June 30, 2017	
Category	**Amount**
GOF budget - Faculty Salaries *(biennium total)*	$3,690,089
GOF budget - TA Salaries *(biennium total)*	$487,309
GOF budget – RA Salaries *(biennium total)*	$50,199
GOF budget - Staff Salaries *(biennium total)*	$781,312
GOF budget – Hourly Salaries *(biennium total)*	$141,339
GOF budget - Operations *(biennium total)*	$48,336
GOF budget - Benefits *(biennium total)*	$1,321,005
DOF budget – *(biennium total)*	$261,056
RCR budget – *(biennium total)*	$383,255
Research Awards *(7/1/15 - 6/30/17)*	$5,337,965
Fee-Based Budgets *(7/1/15 - 6/30/17)*	$658,261
Revenue Budgets *(7/1/15 – 6/30/17)*	$30,936
Non-Endowment Gift Budgets	$91,189
Endowment Operating Funds - Professorships	$0
Endowment Operating Funds - Graduate Fellowships	$11,662
Total	**$13,293,913**

Table 3: Budget information for the 2015-17 Biennium.

July 1, 2017 – February 28, 2019	
Category	**Amount**
GOF budget - Faculty Salaries *(biennium total)*	$3,550,692
GOF budget - TA Salaries *(biennium total)*	$507,135
GOF budget – RA Salaries *(biennium total)*	$62,319
GOF budget - Staff Salaries *(biennium total)*	$827,334
GOF budget – Hourly Salaries *(biennium total)*	$119,037
GOF budget - Operations *(biennium total)*	$13,078
GOF budget - Benefits *(biennium closing balance)*	$1,322,788
DOF budget – *(biennium total)*	$403,450
RCR budget – *(biennium total)*	$451,958
Research Awards *(7/1/17 – 2/28/19)*	$4,340,962
Fee-Based Budgets *(7/1/17 – 2/28/19)*	$997,055
Revenue Budgets *(7/1/17 – 2/28/19)*	$374,285
Non-Endowment Gift Budgets	$67,129
Endowment Operating Funds - Professorships	$56,284
Endowment Operating Funds - Graduate Fellowships	$24,754
Total	**$13,118,260**

Table 4: Current and planned budget information for the 2017-19 Biennium, which ends June 30, 2019.

June 30, 2015		
Category	**# of Endowments**	**Total Category Market Value**
Faculty Support	0	$
Graduate Support	2	$215,228
Undergraduate Support	0	$
Program Support	0	$
Total	**2**	**$215,228**

(a)

June 30, 2017		
Category	**# of Endowments**	**Total Category Market Value**
Faculty Support	0	$
Graduate Support	2	$226,248
Undergraduate Support	0	$
Program Support	0	$
Total	**2**	**$226,248**

(b)

As of January 1, 2019		
Category	**# of Endowments**	**Total Category Market Value**
Faculty Support	1	$1,300,854
Graduate Support	2	$226,483
Undergraduate Support	0	$
Program Support	0	$
Total	**3**	**$1,527,337**

(c)

Table 5: Statistics Endowments: (a) June 30, 2015; (b) June 30, 2017; (c) January 1, 2019.

Funding of TA Quarters				
Academic Year	Total	From Permanent College Allocation	From Temporary Funds	%Permanent
2018-19	55	20	35	36%
2017-18	61	24	37	39%
2016-17	45	25	20	55%
2015-16	52	27	25	52%
2014-15	43	30	13	70%
2013-14	41	24	17	59%

Table 6: Statistics TA slots funded by GOF. The additional slots are funded by special temporary instructional funds from the college and salary released by faculty on leave, sabbatical or buying out with grants.

C Space

The Department of Statistics occupies approximately 7,000 square feet in Padelford Hall, primarily on the second and third floors.

- **Third Floor:** 5721 sf = 38 offices + 2 conference rooms + lounge;
- **Second Floor:** 1177 sf = 11 offices;
- **Lower Level:** 216 sf = 2 staff offices, and the shared use (with Math) of a server room. Other server space is rented in the UW Tower;
- In addition, there are 5 offices located in the Center for Statistics and the Social Sciences (CSSS), occupying approx. 500 sf that are used by Statistics faculty, graduate students and postdocs;
- The Department also has a room for its Tutor and Study Center that is located in the basement of the Communications building (opposite Padelford).

Faculty offices are approx. 100 square feet. Graduate students share offices with between 25 and 60 square feet per person. The two departmental conference rooms accommodate approximately 25 and 6 people respectively. The department has no classrooms. The lounge is used for (informal) receptions, meals and other gatherings. It is insufficient to hold all of our PhD students (approx. 60 people).

The Statistics Department space within Padelford is not conducive to collaboration: some faculty offices are less than 100 square feet and are too small to comfortably accommodate a faculty member and more than two students. Besides the two conference rooms there are very few communal spaces. There is only one graduate student office that can contain more than five people. This is an issue since we have several faculty who have larger research groups.

The existing space hinders the establishment of community: since offices are spread along long communal corridors on two floors (shared with other departments), the department lacks common spaces where academic or social interaction might easily occur.

Padelford Hall is an old building, constructed in the 1960s, by a Spokane-based firm (Walker & McGough) known for designing many prisons in the Northwest. Possibly for this reason, though all offices do have windows, the windows themselves are quite narrow with small walls on each side that serve to restrict the field of vision. Approximately half of the Statistics faculty are jointly appointed with

access to space in other, renovated, buildings. Not surprisingly, these faculty often opt to work outside Padelford!

A recent survey identified the following physical problems:

- *Insect Infestation*: 13 offices (out of 51) suffer from insect infestations; this includes silverfish, cockroaches and beetles.
- *Leaks:* Four offices (out of 51) suffer from water leaks, typically through exterior walls or ceiling; this includes the offices of the Chair and the Departmental Administrator. (The resulting moisture likely exacerbates the insect problems.)
- *Heating/Cooling:* Occupants of more than half the offices report inadequate heating or cooling systems. During the summer, rooms on the east side of the building often reach temperatures in excess of 90F. During the winter, heating often does not come on, or when it does, the rooms become too stuffy.
- *Inadequate Ventilation:* 14 offices are reported as having inadequate ventilation.
- *Mold:* Several offices have issues with mold.
- *Rodents:* Issues with rodents (rats) were also reported.
- *Elevators:* The building contains three elevators, these quite frequently break down, especially during the summer.
- *Asbestos:* 10 offices are known to include asbestos (in ceilings).

D Information Concerning Degree Programs

D.1 Statistics PhD Program

Time To Graduation (Years)					
	n	Median	IQR	Mean	SD
Female	19	5	0.75	5.3	0.85
Male	42	5	1.25	5.3	2.0
All	61	5	0.81	5.3	1.7

Table 7: Time to completion (in years) for PhD graduates, 2009-2018.

PhD Graduates by Year					
Academic Year	Graduated	MLBD	StatGen	Female	International
2017-18	10	3	0	3	5
2016-17	5	1	0	2	2
2015-16	9	0	1	2	2
2014-15	7	0	0	0	2
2013-14	5	0	1	2	0
2012-13	7	0	0	3	3
2011-12	4	-	0	3	1
2010-11	6	-	0	2	4
2009-10	8	-	0	2	3
Total	61				

Table 8: PhD Graduates by option and demographics. No students completed the CSSS Track and no URM students graduated in this period.

STATISTICS PhD Program

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ENROLLMENT (Aut quarter)										
TOTAL	58	43	45	50	55	56	63	65	65	57
Female	21	12	13	16	17	16	16	21	19	17
Male	37	31	32	34	38	40	47	44	46	40
Not URM	38	30	33	36	36	37	40	35	32	26
URM	2						1	2	2	2
Non-WA Resident	27	21	21	22	24	28	32	31	27	25
International	18	13	12	14	19	19	22	28	31	29
WA Resident	13	9	12	14	12	9	9	6	7	3
Continuing	45	39	33	40	43	47	53	52	58	48
New	13	4	12	10	12	9	10	13	7	9
ADMISSIONS (Aut quarter)										
Applications	167	114	163	179	230	275	260	290	364	306
Selectivity (offers)	21%	10%	16%	18%	17%	9%	12%	10%	7%	8%
Yield (accept offer)	34%	45%	50%	38%	36%	38%	40%	47%	33%	42%
URM Applications	1	0	1	6	9	4	6	9	13	9
URM Selectivity	0%		0%	17%	11%	0%	17%	11%	0%	0%
URM Yield				0%	0%		100%	100%		
International Applications	102	61	89	91	135	171	152	169	219	194
International Selectivity	10%	3%	10%	9%	15%	6%	6%	9%	5%	7%
International Yield	10%	0%	33%	38%	35%	27%	44%	40%	40%	31%
DEGREES (Sum-Spr quarters)	7	7	5	5	7	6	7	8	5	

Table 9: Application, Enrollment and Graduation Data for the Statistics PhD Program.

D.2 MS in Statistics – Advanced Methods and Data Analysis (Fee-Based)

MS Graduates by Year			
Academic Year	Graduated	Female	International
2017-18	18	8	16
2016-17	20	11	14
2015-16	18	5	16
2014-15	17	9	12
2013-14	7	4	4
2012-13	1	0	1
2011-12	4	2	2
2010-11	0	0	0
2009-10	2	1	0
Total	87		

Table 10: Statistics Full-Time MS Graduates and demographics. No URM students graduated with an MS during this period.

Full-Time MS Program, Fee-based (Started in 2012)

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ENROLLMENT (Aut quarter)							
TOTAL	7	24	35	39	38	41	49
Full-time	7	23	31	37	35	39	47
Part-time		1	4	2	3	2	2
Female	4	13	15	16	19	15	16
Male	3	11	20	23	19	26	33
Not URM	3	6	6	9	8	5	5
URM							
Non-WA Resident	3	5	4	6	6	5	5
International	4	18	29	30	30	36	44
WA Resident		1	2	3	2		
Continuing		7	17	18	20	18	22
New	7	17	18	21	18	23	27
ADMISSIONS (Aut quarter)							
Applications	28	279	346	485	497	477	484
Offers	26	50	56	62	88	82	94
Selectivity	93%	18%	16%	13%	18%	17%	19%
Yield	19%	34%	34%	34%	19%	28%	29%
URM Applications		1	5	1	1	1	4
URM Selectivity		0%	20%	0%	0%	0%	25%
URM Yield			0%				0%
International Applications	24	239	304	435	439	427	405
International Selectivity	92%	16%	15%	10%	17%	15%	17%
International Yield	14%	31%	38%	33%	18%	31%	34%
DEGREES (Sum-Spr quarters)		7	17	18	20	18	

Table 11: Application, Enrollment and Graduation Data for the Statistics Full-Time (fee-based) MS Program, which started in 2012.

D.3 Statistics Concurrent and Part-Time MS Programs

Concurrent and Part-Time MS Graduates by Year				
Academic Year	Graduated	Female	International	URM
2017-18	8	1	4	0
2016-17	6	2	2	0
2015-16	4+1	1	0	0
2014-15	2	2	2	0
2013-14	4	2	4	0
2012-13	6	3	0	0
2011-12	7	1	3	0
2010-11	10+2	5	5	0
2009-10	7	3	1	1
Total	54+3			

Table 12: Concurrent and Part-Time MS Graduates and demographics.

MS Degree, Concurrent and Part-Time

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
ENROLLMENT (Aut quarter)										
TOTAL	5	12	12	5	2	4	3	3	4	5
Full-time	2	10	12	3	1	1				
Part-time	3	2		2	1	3	3	3	4	5
Female	2	7	5	3	1	1			1	2
Male	3	5	7	2	1	3	3	3	3	3
Not URM	5	4	5	2	1	3	2	3	4	5
URM										
Non-WA Resident		2	1					1	1	
International		8	7	3	1	1	1			
WA Resident	5	2	4	2	1	3	2	2	3	5
Continuing	3	3	9	5	1	4	2	1	2	4
New	2	9	3		1		1	2	2	1
ADMISSIONS (Aut quarter)										
Applications	62	92	186	184	24	8	9	14	17	17
Offers	9	15	11	5	10	4	4	4	9	3
Selectivity	13%	16%	5%	2%	42%	50%	44%	29%	53%	18%
Yield	63%	60%	70%	25%	50%	75%	75%	75%	100%	100%
URM Applications	1		1	8	9	4	6	9	14	10
URM Selectivity	0%		0%	13%	11%	0%	17%	11%	0%	0%
URM Yield				0%	0%		100%	100%		
International Applications	140	129	240	232	149	172	157	174	227	203
International Selectivity	9%	8%	6%	5%	18%	7%	7%	10%	7%	7%
International Yield	31%	70%	47%	36%	41%	33%	45%	41%	60%	40%
DEGREES (Sum-Spr quarters)	7	12	7	6	4	2	5	6	8	

Table 13: Application, Enrollment and Graduation Data for the Concurrent and Part-Time MS in Statistics.

D.4 Data Science MS Program

Data Science MS Graduates by Year				
Academic Year	Graduated	Female	International	URM
2018-19*	40	8	16	1
2017-18	22	12	15	0
Total	62			

Table 14: Professional Data Science MS Graduation Statistics. *Projections. The program commenced in AY 2016-17. Those graduating in 2017-18 are the inaugural class.

D.5 Bachelor of Science in Statistics Program

BS Graduates by Year				
Academic Year	Graduated	Female	International	URM
2017-18	20	13	10	0
2016-17	24	15	13	1
2015-16	24	13	19	0
2014-15	37	25	26	1
2013-14	27	14	16	0
2012-13	31	17	19	1
2011-12	34	21	19	0
2010-11	15	5	2	0
2009-10	8	1	0	1
Total	220			

Table 15: Statistics Bachelor Graduates and demographics.

Applicants to Statistics Major		
Academic Year	Applicants	Admitted
2017-18	90	40
2016-17	124	34
2015-16	94	40
2014-15	56	25
2013-14	67	30
2012-13	30	22
Total	461	191

Table 16: Applications and admissions to the BS Major since entry became competitive.

D.6 Statistics Minor

Undergradate Students Graduating with a Statistics Minor

2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
12	8	5	3	8	6	6	3	7

Table 17: Students graduating with a Statistics Minor.

D.7 Applied and Computational Mathematical Sciences Major

ACMS Graduates by Year				
Academic Year	Graduated	Female	International	URM
2017-18	57	15	25	0
2016-17	70	29	33	2
2015-16	83	33	54	0
2014-15	71	29	37	0
2013-14	60	19	20	1
2012-13	107	33	30	1
2011-12	116	31	17	2
2010-11	88	25	9	1
2009-10	61	15	6	0
Total	713			

Table 18: ACMS Major graduation statistics. **URM** denotes "under-represented minorities".

ACMS Graduates by Program Option										
Academic Year	Graduated	DSS	STAT	BLS	DMA	EPS	ME	OR	SCNA	SBS
2017-18	57	5	-	4	22	5	14	0	11	0
2016-17	70	-	1	5	21	12	20	0	11	0
2015-16	83	-	4	4	23	6	28	0	18	0
2014-15	71	-	1	5	16	7	29	3	10	0
2013-14	60	-	3	2	15	10	23	1	6	0
2012-13	107	-	3	7	39	18	27	1	10	2
2011-12	116	-	2	5	34	38	25	2	8	2
2010-11	88	-	6	5	30	18	24	2	3	0
2009-10	61	-	27	5	20	12	13	2	4	3
Total	713									

Table 19: ACMS Major graduates by pathway. Program Options are: **DSS**: Data Science and Statistics; **STAT**: Statistics (deprecated); **BLS**: Biological and Life Sciences, **DMA**: Discrete Math and Algorithms, **EPS**: Engineering and Physical Sciences, **ME**: Mathematical Economics, **OR**: Operations Research (deprecated), **SCNA**: Scientific Computing and Numerical Analysis, **SBS**: Social and Behavioral Sciences. Though figures for AY18-19 are incomplete but 15 are expected to graduate from the DSS pathway.

E Information Concerning Faculty

This section includes a one page CV for all faculty, tenure-track and acting professors as well as part-time lecturers are included. Links to their full online CV and publication lists are also included.

E.1 Tamre P. Cardoso

Part-Time Lecturer

Homepage: https://www.stat.washington.edu/person/tamre-cardoso

Full CV: https://stat.uw.edu/sites/default/files/files/Cardoso_CV2019.pdf

UW history: Started as a Part-Lecturer in September 2004.

Background: B.S. in Microbiology, California State University, Long Beach (CSULB) 1980. B.A. in Mathematics and Computer Science, CSULB 1984. M.S. in Microbiology CSULB 1984. Ph.D. in Quantitative Ecology and Resource Management, University of Washington 2004.

Interests and Activities:

Teaching: II have taught a variety of lower and upper division statistics courses in three departments at UW Seattle: Quantitative Ecology and Resource Management; Quantitative Science; Statistics. I regularly teach an online version of an introductory course (STAT 311).

Service: Supervising two undergraduate majors in undergraduate research starting in 2018.

E.2 Yen-Chi Chen

Assistant Professor

Homepage: http://faculty.washington.edu/yenchic/

Full CV: http://faculty.washington.edu/yenchic/CV_yenchic.pdf

Link to publications:
https://scholar.google.com/citations?user=ZNqgiygAAAAJ&hl=en

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=216784

UW history: Started as Assistant Professor in September 2016.

Background: B.A. in Physics, National Taiwan University 2011. M.S in Statistics, 2013 and Ph.D. in Statistics, 2016, Carnegie-Mellon University.

Selected Awards and Honors: William S. Dietrich II Presidential Ph.D. Fellowship Award 2015; NIPS Travel Award 2015; Student of the Year Award 2016; Umesh K. Gavasakar Thesis Award 2017.

Interests and Activities:
Research areas: Nonparametric statistics; cluster analysis; topological data analysis; non-ignorable missing data; astrostatistics; applications in astronomy, machine learning, biostatistics, epidemiology, and dementia study.
Publications: 24 refereed journal or conference publications.
Grants: PI or co-PI on 2 federal grants.
Teaching: I have taught 8 courses at UW. Average course evaluation: 4.5/5, since 2016.
Community Activities: Associate editor of the Electronic Journal of Statistics

E.3 Adrian Dobra

Associate Professor, Department of Statistics, University of Washington
Faculty at Center for Statistics and the Social Sciences, Center for Studies in Demography and Ecology, eScience Institute, and Department of Biobehavioral Nursing and Health Informatics at University of Washington.

Homepage: https://www.stat.washington.edu/adobra/

Full CV: https://www.stat.washington.edu/adobra/AdrianDobra-2018.pdf

Link to publications: https://scholar.google.com/citations?user=02wpYPkAAAAJ

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=59013

UW history: Started as Assistant Professor in September 2006. Promoted to Associate Professor in 2012. Director of the UW Master of Science in Data Science program, Chair of the Graduate School's Interdisciplinary Data Science Group, Associate Director and Graduate Chair, Center for Statistics and the Social Sciences since 2018.

Background: B.S. in Mathematics in 1995, and M.S. in Computer Science, University of Bucharest in 1996. Ph.D. in Statistics, Department of Statistics, Carnegie Mellon University, 2002. Postdoctoral Fellow, National Institute of Statistical Sciences and the Statistical and Applied Mathematical Sciences Institute, 2002-2004. Research Assistant Professor, Department of Statistical Science, Duke University, 2004-2006.

Selected Awards and Honors: Umesh Gavasakar Ph.D. Thesis Award, Carnegie Mellon University, 2002; Second Place and Silver Medal, Romanian National Mathematical Olympiad, 1998; Third Place and Bronze Medal, Romanian National Mathematical Olympiad, 1986; Panel Member, National Science Foundation; Editor, Bayesian Analysis (2015–); Associate Editor, Annals of Applied Statistics (2013–), Associate Editor, Metrika (2017–).

Interests and Activities:
Research areas: Spatiotemporal models, graphical models, computational social science and epidemiology, Bayesian statistics, modeling of complex dynamical phenomena using big data.
Publications: 48 refereed journal publications; 9 refereed book chapters.
Grants: PI on 3 federal grants; Co-I on 4 federal grants.
Teaching: I have taught 10 different courses at UW. Average course evaluation: 4.1/5, since 2017.
Consulting: Office for Nursing Research since 2008.
Research Advised: 19 PhD students at UW, 8 of whom have gone to research positions.
Community Activities: Session organizer and session chair; conference organizer.

E.4 Mathias Drton

Professor of Statistics

Homepage: https://www.stat.washington.edu/~md5/

Full CV: https://www.stat.washington.edu/~md5/cv.pdf

Link to publications:
https://scholar.google.com/citations?user=CjRMyA4AAAAJ&hl=en

Math Genealogy:
http://www.genealogy.ams.org/id.php?id=84982

UW history: Started as Professor in September 2012.

Background: Diplom in Applied Mathematics from Universität Augsburg, Germany. DEA in Applied Mathematics from Université Paul Sabatier Toulouse, France. Ph.D. in Statistics, 2004, University of Washington, Seattle. Postdoc at UC Berkeley, 2004-2005. Assistant, Associate and Full Professor of Statistics at the University of Chicago, 2005-2012.

Selected Awards and Honors: Foreign Member of the Royal Danish Academy of Sciences and Letters, 2018; Medallion Lecture of the Institute of Mathematical Statistics, 2014; Fellow of the Institute of Mathematical Statistics, 2016; Bayesian Analysis: Best paper award, 2014; Sloan Research Fellowship, 2009; NSF CAREER grant, 2008; Conference on Uncertainty in Artificial Intelligence: Best student paper award, 2004.

Interests and Activities:
Research areas: Multivariate statistics and graphical models; algebraic statistics, causal inference.
Publications: 74 refereed journal or conference publications; 2 books (1 as editor).
Editorial Activities: Associate editor for Annals of Statistics, Biometrika, Electronic Journal of Statistics, Journal of the Royal Statistical Society Series B.
Grants: PI or co-PI on 7 federal grants.
Teaching: I have taught 8 different courses at UW. Course evaluation: 4.5/5 as mean of adjusted combined medians since 2013.
PhD Advising: Advisor for 7 PhD students at UW, 2 have started tenure-track positions.
Community Activities: Co-organizer of 4 research workshops and summer schools; Program committee member for Annual Meeting of Institute of Mathematical Statistics (IMS), 2018; Member of IMS Council, since 2017; Chair of IMS committees to select editors and special lecturers, 2010-11, 2017-18.

E.5 Elena A. Erosheva

Professor WOT of Statistics and Social Work
Core Faculty, Center for Statistics and the Social Sciences (CSSS)
Affiliate Faculty, Center for Studies in Demography and Ecology

Homepage: https://www.stat.washington.edu/elena/

Full CV: https://www.stat.washington.edu/elena/CVeroshevaUW.pdf

Link to publications:
https://scholar.google.com/citations?user=sko_EeEAAAAJ&hl=en

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=8777

UW history: Started as Research Assistant Professor in September 2002. Became Assistant Professor WOT in 2005 and was promoted to Associate and then to Full Professor WOT in 2007. Director of Statistical Consulting, CSSS, 2007-2016. Associate Director of CSSS, 2016-2018.

Background: B.A. in Mathematics and Applied Mathematics, Novosibirsk State University, Russia, 1995. M.S in Statistics, Utah State University, 1998 and Ph.D. in Statistics, 2002, Carnegie-Mellon University.

Selected Awards and Honors: International Chair in Data Science, Université Côte d'Azur, France. *First Prize* winner in the category of Most Creative Idea for Detection of Bias in Peer Review, 2014 (with Carole Lee). *Mitchell Prize* 2013 for an outstanding paper that describes how a Bayesian analysis has solved an important applied problem (with D. Telesca, R. Matsueda, and D. Kreager).

Interests and Activities:
Research areas: Multivariate data analysis; discrete data analysis; latent variable modeling; methodology for applications in the social, behavioral and medical sciences.
Publications: 33 refereed journal or conference publications; 2 edited books and reports, 3 issued patents.
Grants: PI or co-PI on 9 federal grants.
Teaching: I have taught 9 different courses in UW, 5 of which I designed and developed as new courses, and 2 of which I co-developed.
PhD Advising: Main advisor for 2 PhD students at UW Statistics.
Community Activities: Program Chair, Section on Bayesian Statistical Science, Joint Statistical Meetings, 2018.

E.6 Thomas R. Fleming

Professor of Biostatistics
Professor of Statistics

Homepage: https://www.biostat.washington.edu/people/thomas-fleming

Full CV: https://stat.uw.edu/sites/default/files/files/Fleming_CV%202018.pdf

Current Index to Statistics: https://www.statindex.org/authors/21201

Math Genealogy: https://www.genealogy.math.ndsu.nodak.edu/id.php?id=55098

UW history: Full Professor in Biostatistics, 1984-present. Full Professor in Statistics, 1987-present. Associate Director in Biostatistics/Epidemiology Core, Center for AIDS Research, 1988-1993. Director in Biostatistics/Epidemiology Core, Center for AIDS Research, 1993-2007. Acting Chairman in Biostatistics, 1990-1991. Chairman in Biostatistics, 1993-2006.

Background: B.A. in Mathematics, College of St. Thomas, 1972. M.S. in Statistics, University of Maryland, 1974. Ph.D. in Statistics, University of Maryland, 1976.

Selected Awards and Honors: Outstanding Teaching Award, School of Public Health from the University of Washington, 1990. FDA Commissioner's Special Citation Award for Extraordinary Contribution to the Agency, 2002. Greenberg Lecturer at University of North Carolina, 2007. Distinguished Lecturer at the School of Public Health at the University of Washington, 2009. Ross Prentice Endowed Professor of Biostatistical Collaboration, 2011. Elected to Membership in the Institute of Medicine of the National Academies, 2012, which became the National Academy of Medicine in 2015. Inaugural Speaker, David L. DeMets Lectureship in Health and Quantitative Investigation, University of Wisconsin, 2015. Inaugural Speaker, Janice Pogue Lectureship, McMaster University, Hamilton, 2017.

Interests and Activities:
Research areas: Design, conduct & analysis of clinical trials; survival analysis; sequential analysis.
Publications: 264 refereed journal or conference publications.
Grants: PI of numerous grants and contracts from NIH providing tens of millions of dollars of support for research in statistical methods or for the design, conduct and analysis of clinical trials of interventions for the treatment and prevention of diseases.
Teaching: I have taught 8 different courses at UW.
PhD Advising: Advisor for over 20 PhD students at UW.

E.7 Emily Fox

Associate Professor of Statistics
Associate Professor of Computer Science & Engineering
Amazon Professor of Machine Learning
Adjunct Associate Professor of Electrical Engineering

Homepage: https://homes.cs.washington.edu/~ebfox/

Full CV: https://stat.uw.edu/sites/default/files/files/Fox_CV%202019.pdf

Link to publications:
https://scholar.google.com/citations?hl=en&user=OO-2710AAAAJ

Math Genealogy: https://www.genealogy.math.ndsu.nodak.edu/id.php?id=145227

UW history: Started as Assistant Professor in July 2012. Promoted to Associate Professor in 2016.

Background: B.S. in Electrical Science and Engineering, Massachusetts Institute of Technology, 2004. M.S in Electrical Engineering and Computer Science, Massachusetts Institute of Technology, 2005. Ph.D. in in Electrical Engineering and Computer Science, Massachusetts Institute of Technology, 2009.

Selected Awards and Honors: Amazon AWS Machine Learning Research Award, 2018; Presidential Early Career Award in Science & Engineering (PECASE), 2017; AWIS Seattle Chapter Award for Scientific Advancement in STEM, 2017; ONR Young Investigator Award, 2015; Sloan Research Fellowship, 2015; NSF CAREER Award, 2014; Amazon Machine Learning Professorship in Statistics, 2012; Leonard J. Savage Award for Best Thesis in Applied Methodology, 2009; MIT EECS Jin-Au Kong Outstanding Doctoral Thesis Prize, 2009; National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship, 2009; National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2005; National Science Foundation Graduate Research Fellowship, 2005; Chorafas Award for excellent academic performance and superior contributions in research, 2005; David Adler Memorial 2nd Place Thesis Prize for Best MIT Master's Thesis in EE, 2005.

Interests and Activities:
Research areas: Structured deep generative models, scalable Bayesian inference, modeling of large-scale time series.
Publications: 46 refereed journal or conference publications.
Grants: PI or co-PI on 4 federal grants.
Teaching: I have taught 5 different courses at UW and started a Coursera Machine Learning Specialization course in 2015. Average course evaluation: 4.4/5, since 2013.
PhD Advising: Advisor for 11 Ph.D. students at UW.

E.8 Ranjini Grove

Part-Time Lecturer and Undergraduate Program Coordinator

Homepage: https://www.stat.washington.edu/index.php/person/ranjini-grove

Full CV: https://stat.uw.edu/sites/default/files/files/Grove_CV.pdf

UW history: Started as Part-Time Lecturer in March 2011. Undergraduate Program Coordinator since 2017.

Background: B.A. in Mathematics Statistics, Delhi University 1989. M.S and Ph.D. in Operations Research and Industrial Engineering, Cornell University 1995.

Selected Awards and Honors: Best Student, Delhi University 1986; Visiting Scholar, Carnegie Mellon University, 1997.

Interests and Activities:

Service: Statistics Undergraduate Faculty Program Coordinator.

Teaching: I have taught a variety of classes ranging from large introductory courses for non-majors to mathematical statistics for our juniors and the applied statistics capstone for our graduating seniors.

Professional Development: Participant in the Evidence Based Teaching workshop series organized by the Center for Teaching and Learning at UW (fall 2018, winter 2019).

UW Community Building Activities:
Editor – Student's t time – a quarterly newsletter for the statistics major.
Co-organizer – UW DATAFEST – a data analysis competition sponsored by the American Statistical Association.

Outreach: Co-advisor on redesign of Shoreline MATH 211.

E.9 Fang Han

Assistant Professor of Statistics
Adjunct Assistant Professor of Economics

Homepage: https://www.stat.washington.edu/~fanghan/

Full CV: https://www.stat.washington.edu/~fanghan/Han_CV.pdf

Link to publications:
https://scholar.google.com/citations?hl=en&user=aCsO6RMAAAAJ

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=206196

UW history: Started as Assistant Professor in June 2016.

Background: B.A. in Probability and Statistics, Peking University, 2008. M.S in Biostatistics, University of Minnesota, 2010. Ph.D. in Biostatistics, Johns Hopkins University, 2015.

Selected Awards and Honors: Google Ph.D. Fellowship in Statistics, 2013-15; Margaret Merrell Award, 2015; ASA Biometrics Section David P. Byar Young Investigator Travel Award, 2014; ICSA Distinguished Student Paper Award, 2013; AISTATS notable paper award, 2013; ENAR Distinguished Student Paper Award, 2013.

Interests and Activities:
Research areas: High dimensional statistics and probability; time series analysis; nonparametric and semiparametric models; econometrics.
Publications: 36 refereed journal or conference publications.
Grants: PI on 1 federal grant.
Teaching: I have taught 4 different courses at UW. Average course evaluation: 4.4/5, since 2016.
PhD Advising: Advising 3 PhD students at UW.
Community Activities: Co-organizing ICSA International Conference, December 2019.

E.10 Zaid Harchaoui

Assistant Professor Department of Statistics
Adjunct Professor, Allen School in Computer Science & Engineering
Data Science Fellow, eScience Institute

Homepage: http://faculty.washington.edu/zaid/

Full CV: http://faculty.washington.edu/zaid/transfer/fullcv.pdf

Link to publications:
http://faculty.washington.edu/zaid/publications.html

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/

UW history: Started as Assistant Professor in September 2016. Promoted to Associate Professor effective September 2019.

Background: MSc. in Applied Mathematics and Computer Science, Ecole Nationale Supérieure des Mines, 2004. PhD in Statistical Machine Learning, Telecom ParisTech, 2008.

Selected Awards and Honors: CIFAR Associate Fellow ("Learning in machine and brains" program); Google Faculty Research Award; Criteo Faculty Research Award; Inria Award for scientific excellence; NIPS Reviewer Award; France-Berkeley fund award; CNRS PhD Fellowship.

Interests and Activities:
Research areas: high-dimensional statistics, kernel-based methods, convex optimization, non-convex optimization, representation learning.
Publications: 60 refereed journal or conference publications.
Grants: PI or co-PI on 4 federal grants.
Teaching: I have taught 4 different courses at UW. Median course evaluation: 4.0/5, since 2016.
PhD Advising: Advisor for 5 PhD students at UW. Graduated 8 PhD student while at Inria.
Community Activities: Chair of Diversity Committee. PhD Admissions Committee. Co-PI of the Institute on Algorithmic Foundations of Data Science under the umbrella of the eScience Institute. Area chair for main statistical machine learning conferences (ALT, ICLR, ICML, NeurIPS). Action Editor of Journal of Machine Learning Research.

E.11 Sham M. Kakade

Associate Professor in Computer Science and Statistics
Adjunct Professor of Electrical Engineering

Homepage: https://homes.cs.washington.edu/~sham/

Full CV: https://homes.cs.washington.edu/~sham/tmp/Kakade_cv.pdf

Google Scholar: https://scholar.google.com/citations?user=wb-DKCIAAAAJ&hl=en

Publications: https://homes.cs.washington.edu/~sham/publications.html

UW history: Associate Professor since 2015.

Background: B.S., Physics with Honors, 1997; PhD, Computational Neuroscience, Gatsby Computational Neuroscience Unit, University College London 2003

Selected Awards and Honors: Best paper, INFORMS Revenue Management and Pricing Section Prize, 2014 for *Optimal Dynamic Mechanism Design and a Virtual Pivot Mechanism* with Ilan Lobel & Hamid Nazerzadeh. Machine Learning/Google Distinguished Lecture, CMU: *Tensor Decompositions for Learning Latent Variable Models*. National Academy of Sciences, Invited Organizer for the "Decision Making Under Uncertainty" Session (2010). IBM Research, Pat Goldberg Best Paper Award for *Cover Trees for Nearest Neighbor.* (2007)

Interests and Activities:
Research areas: Machine learning and Artificial Intelligence.
Grants: PI or co-PI on 6 federal grants.
Teaching: I have taught 6 courses at UW.
PhD Advising: Advisor for 5 PhD students at UW.
Community Activities: Co-director of the Algorithmic Foundations of Data Science Institute (ADSI), http://ads-institute.uw.edu//index.html

E.12 Richard A. Kronmal

Professor of Biostatistics
Professor of Statistics

Homepage: https://www.biostat.washington.edu/people/richard-kronmal

Full CV: https://stat.uw.edu/sites/default/files/files/Kronmal_CV%202019.pdf

Current Index to Statistics: https://www.statindex.org/authors/14792

Math Genealogy: https://www.genealogy.math.ndsu.nodak.edu/id.php?id=26371

UW history:
Instructor in Preventive Medicine, 1964-1966. Assistant Professor in Preventive Medicine, 1966-1970. Associate Professor in Biostatistics, 1970-1975. Chairman of the Biomathematics Group, 1973-1985. Full Professor in Biostatistics, 1975-present. Full Professor in Statistics, 1987-present.

Background:
A.B. from University of California, Los Angeles, 1961. Ph.D. in Biostatistics, University of California, Los Angeles, 1964.

Selected Awards and Honors:
U.S. Public Health Fellowship, 1961-63. Research Career Development Award, Public Health Service, 1968-72. Elected Fellow of the American Statistical Association, 1981.

Interests and Activities:
Research areas: Nonparametric density estimation, computer algorithms, cardiovascular data analysis, clinical trials.
Grants and Contracts: Currently PI on two foundation grants and more than 3 NIH contracts. I have previously had more than 100 grants and contracts.
Teaching: I have taught 9 different courses at UW.
PhD Advising: Advisor for 17 PhD students at UW.
Publications: 387 refereed journal or conference publications.

Alex Luedtke

Assistant Professor of Statistics, University of Washington
Affiliate Assistant Member, Vaccine and Infectious Disease Division, Fred Hutchinson Cancer Research Center

Homepage: http://www.alexluedtke.com

Full CV: http://cv.alexluedtke.com

Link to publications:
https://scholar.google.com/citations?user=pWvrysEAAAAJ&hl=en

UW history: Started as Assistant Professor in August 2018.

Background: Sc.B. in Applied Mathematics, Brown University, 2012. Ph.D. in Biostatistics, 2016, University of California, Berkeley.

Selected Awards and Honors: Eric L Lehmann Citation, UC Berkeley, 2016; Extraordinary Student Research Award, Division of Biostatistics, UC Berkeley, 2016; JSM Travel Award from the San Francisco Bay Area Chapter of the American Statistical Association, 2015; Outstanding Graduate Student Instructor Award, 2015; Berkeley Fellowship, 2012-2016; NDSEG Fellowship, 2012-2015; Reshetko Family Scholarship, 2012.

Interests and Activities:
Research areas: semi- and nonparametric statistical methods; causal inference; design, analysis, and monitoring of (HIV) vaccine trials; methods for developing and evaluating the impact of implementing individualized treatment strategies; deep adversarial learning of minimax statistical procedures.
Publications: 25 refereed journal publications or invited discussion pieces; 3 book chapters.
Teaching: I taught my first course at UW during the winter quarter 2019.
PhD Advising: Co-advisor for 3 PhD students at UW. Active research mentor/supervisor for 3 additional UW students.
Community Activities: Co-editor of forthcoming issue of the *International Journal of Biostatistics* titled *Biostatistics in Africa 2019*. Lead statistician on two HIV vaccine efficacy trials.

E.13 Caren Marzban

Lecturer, Part-Time (Statistics)
Principal Physicist (Applied Physics Lab)

Homepage: http://faculty.washington.edu/marzban/

Full CV: http://faculty.washington.edu/marzban/cv_nsf.pdf

Link to publications:
https://scholar.google.com/citations?hl=en&user=X5Z5aYkAAAAJ&view_op=list_works&sortby=pubdate

Academic TreeGenealogy:https://academictree.org/physics/tree.php?pid=779477

UW history: Started as Visitor in 2001, followed by lecturer in 2002, until present. Also a Principal Physicist at the Applied Physics Lab.

Background: B.S. in Physics, Michigan State University, 1981, and Ph.D. in Physics, University of North Carolina, 1988.

Selected Awards and Honors: Ex-Chair of The Committee on Artificial Intelligence Applications to Environmental Science of the American Meteorological Society.

Interests and Activities:
Research areas: Applied Statistics and Machine Learning.
Publications: 52 refereed journal or conference publications; Co-editor and contributor of two chapters to Artificial Intelligence Methods in the Environmental Sciences, 2008; Springer-Verlag.
Grants: PI or co-PI on 6 federal grants.
Teaching: I have taught 8 different courses at UW. Average course evaluation: 4.4/5, since 2015.
Community Activities: Organizer for Artificial Intelligence short courses at the American Meteorological Society's meetings.

E.14 Tyler H. McCormick

Associate Professor of Statistics & Sociology

Homepage: https://thmccormick.github.io

Full CV: https://thmccormick.github.io/files/tyler_cv.pdf

Link to publications:
https://scholar.google.com/citations?user=b7HPI48AAAAJ&hl=en

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=182012

UW history: Started as Assistant Professor in July 2011. Promoted to Associate Professor in 2016.

Background: B.A. 2005, Duke University; M.S. in Statistics 2008 University of Connecticut; M.A. in Statistics 2009, Columbia University, M.Phil in Statistics 2010, Columbia University; Ph.D. in Statistics 2011, Columbia University

Selected Awards and Honors: NIH Career Development (K01) Award; US Army Young Investigator Program (YIP) Award; Google Faculty Award.

Interests and Activities:
Research areas: Social networks, Bayesian methods.
Publications: 32 refereed journal or conference publications; 2 refereed book chapters.
Grants: PI or co-PI on 6 federal grants.
Teaching: I have taught 6 different courses at UW.
Advising: Advised 1 PhD student, 2 Postdoctoral Scholars, 2 undergraduate theses.
Selected community Activities: Editor, *Journal of Computational and Graphical Statistics* (2019-2021).

E.15 Marina Meila

Professor of Statistics
Adjunct Professor of Computer Science and Engineering, and of Electrical Engineering

Homepage: https://www.stat.washington.edu/mmp/

Full CV: https://www.stat.washington.edu/mmp/cv.pdf

Link to publications:
https://scholar.google.com/citations?hl=en&user=zbRUiLgAAAAJ&view_op=list_works

Math Genealogy: https://www.genealogy.math.ndsu.nodak.edu/id.php?id=87374

UW history: Started as Assistant Professor in September 2000. Promoted to Associate Professor in 2007 and to Full Professor in 2015. Director of the Applied and Computational Mathematical Sciences Program 2015-2018, and Graduate Program Coordinator since 2017.

Education: M.S. in Automatic Control, 1985, Polytechnic University of Bucharest. PhD in Electrical Engineering and Computer Science, 1999, Massachusetts Institute of Technology. Postdoctoral Fellow 1999-2000, Carnegie-Mellon University.

Selected Awards and Honors: Simons Fellow, Institute for Pure and Applied Mathematics (IPAM), 2019; Long term visitor at IPAM, 2016, Simons Institute for the Theory of Computing, 2017, 2014, Institute for Mathematics and its Applications, 2010; Visiting Scholar, MIT, 2008-2009.

Interests and Activities:
Research areas: Statistical learning; unsupervised learning; non-linear dimension reduction and geometric data analysis; modeling and analysis of preferences and ranked data; mathematics and statistics of fairness and social choice; foundations of clustering; algorithms, computation and optimization for machine learning; machine learning for molecules and materials.
Publications: 70 refereed journal or conference publications; one edited volume.
Grants: PI or co-PI on 8 federal grants.
Teaching: I have taught 9 different regularly offered courses at UW, all of them redesigned or created by me, and 8 special topics and seminars
PhD Advising: Advisor for 6 PhD theses at UW, currently advisor/coadvisor for 6 students.
Community Activities: Program Chair (2015), Chair (2016), Secretary of the Board (since 2018) for the Uncertainty in AI Conference, Program Chair (2007) for the AI and Statistics Conference, Senior Area Chair and Senior Program Committee for 3-4 major machine learning meetings/year in the last 5 years. Organizer of IPAM Long Programs (2016, 2019). Led week-long workshop at the Kinnaird College for Women, Lahore, Pakistan, (2012).

E.16 Emilija Perković

Acting Assistant Professor at the Department of Statistics

Homepage: https://emilijaperkovic.com/

Full CV:
https://emilijaperkovic.com/wp-content/uploads/2019/01/cv.pdf

Link to publications:
https://scholar.google.ch/citations?user=waRO09AAAAAJ&hl=en

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=238346

UW history: Started as Acting Assistant Professor in September 2018.

Background: B.A. in Mathematics, University of Belgrade, 2012. M.S in Statistics, 2014 and Ph.D. in Statistics, 2018, ETH Zürich.

Interests and Activities:
Research areas: Causal inference; identifiability of causal effects from observational data, graphical models; applications in artificial intelligence, biostatistics, epidemiology and social sciences.
Software Since 2014, I have been an active contributing author for the R package pcalg, available on CRAN.
Teaching: I have taught two different courses at UW. Average course evaluation: 4.4/5, since 2018.
Academic Service: Refereed for Annals of Statistics, Journal of the Royal Statistical Society, International Journal of Approximate Reasoning, ICML, NeurIPS, UAI, ACM TIST.

Short Description of Research:
Scientific research is often concerned with questions of cause and effect. For example, does eating processed meat cause certain types of cancer? Ideally, such questions are answered by randomized controlled experiments. However, these experiments can be costly, time consuming, unethical or impossible to conduct. In the example above, forcing a group of people to eat high amounts of potentially carcinogenic foods would be unethical. Hence, often the only available data to answer causal questions is observational.

My research is on causal inference from observational data. It includes developing theoretical results, as well as practical algorithms to improve upon existing methods and pave the way for causal inference in novel scenarios.

E.17 Michael D. Perlman

Professor of Statistics

Full CV: https://stat.uw.edu/sites/default/files/files/Perlman_CV%202019.pdf

Link to publications:
https://scholar.google.com/citations?view_op=new_articles&hl=en&imq=Michael+D.+Perlman#

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=25299

UW history: Professor and Founding Chair of Statistics, July 1979-present.

Background: B.S. in Mathematics, Caltech 1963; M.S in Mathematics, Stanford 1965; Ph.D. in Statistics, Stanford 1967. Assistant/Associate Professor of Statistics, University of Minnesota 1968-73; Associate/Full Professor of Statistics, University of Chicago 1973-79, Chair 1974-77.

Selected Awards and Honors: NSF Postdoctoral Fellow, University of Cambridge 1967-68; Editor, Annals of Statistics 1983-85; Erskine Fellow, University of Canterbury NZ 1987; Fellow, Institute of Mathematical Statistics and American Statistical Association; IMS Special Invited Papers, 1984 and 2000; Elected Member IMS Council 1994-1997.

Interests and Activities:
Research areas: Multivariate analysis, decision theory, multivariate probability inequalities, graphical Markov models, inference for stochastic processes, statistical education.
Publications: Over 100 refereed journal publications.
Grants: Federal grants from NSF and NSA, 1971-present.
Conferences organized: Oberwolfach Workshop "Algebraic and Combinatorial Methods in Multivariate Analysis," 1995; AMS-IMS-SIAM Summer Research Conference "Graphical Markov Models, Influence Diagrams, and Bayesian Belief Networks," July 1997, Seattle.
Courses taught: Elementary Probability and Statistics, Mathematical Statistics, Measure Theory and Probability, Multivariate Analysis, Matrix Algebra, Large Sample Theory, Sequential Analysis, Decision Theory, Inequalities in Statistics and Probability, Stochastic Processes, Linear Statistical Models, Graphical Markov Models.
PhD Advising: Advisor for 5 PhD students at U.Chicago, 4 at U.Washington.

E.18 Adrian E. Raftery

Boeing International Professor of Statistics and Sociology

Homepage: https://www.stat.washington.edu/raftery/

Link to publications: https://www.stat.washington.edu/raftery/Research/publications.html

Google Scholar: https://scholar.google.com/citations?user=QN9RQAYAAAAJ&hl=en&oi=ao

Math Genealogy: http://www.genealogy.ams.org/id.php?id=22289&fChrono=1

UW history: Associate Professor of Statistics and Sociology, 1986-1989. Full Professor of Statistics and Sociology, 1989-present. Founding Director, Center for Statistics and the Social Sciences, 1999-2009. Blumstein-Jordan Endowed Professor of Sociology, 2005-2010. Boeing International Professor of Statistics and Sociology, 2018-present.

Background: B.A. (Mod.) (1st class) in Mathematics, Trinity College Dublin, 1976. M.Sc. in Statistics and Operations Research, Trinity College Dublin, 1977. A.I.A. (Associate of the Institute of Actuaries), London, 1979. Doctorate in Mathematical Statistics, Université Pierre et Marie Curie, Paris, 1980.

Selected Awards and Honors: Member of the United States National Academy of Sciences, 2009; Fellow of the American Academy of Arts and Sciences, 2003; Member Washington State Academy of Sciences, 2009; Honorary Member, Royal Irish Academy, 2013; Fellow, American Statistical Association, 1994; Fellow, Institute of Mathematical Statistics, 2007; Elected member, International Statistical Institute, 2014; Most cited researcher in mathematics in the world, 1995–2005 (Thomson-ISI); Science Foundation Ireland St. Patrick's Day Medal, 2017; Emmanuel and Carol Parzen Prize for Statistical Innovation,Texas A& M University, 2013; American Statistical Association 2011 Award for Outstanding Statistical Application; American Statistical Association 2011 Statistics in Chemistry Award; American Society for Quality 2011 Wilcoxon Award; Buehler-Martin Lecturer, University of Minnesota, 2011.

Interests and Activities:
Research areas: Bayesian model selection; Model-based clustering; Statistical inference for deterministic models; Statistical demography; Statistics for climate science; Statistical inference for the HIV/AIDS epidemic; Inference for gene regulatory networks.
Publications: 212 refereed journal publications; 19 refereed book chapters; 4 edited books; 59 non-peer-reviewed publications.
Grants: PI on 13 federal grants from NSF, NIH and ONR, and co-PI on many other grants.
Teaching: I have taught 18 different courses at UW. Average course evaluation: 4.1/5, since 2014.
PhD Advising: Advisor for 29 PhD students, 21 have gone on to tenure-track positions.
Community Activities: Co-organizer, annual Working Group on Model-Based Clustering, every year 1994-2019.

E.19 Thomas S. Richardson

Professor and Chair of Statistics
Adjunct Professor of Economics and Electrical Engineering

Homepage: https://www.stat.washington.edu/tsr/

Full CV: https://www.stat.washington.edu/tsr/cvbibliofeb2019.pdf

Link to publications:
https://scholar.google.com/citations?user=y7c-tjoAAAAJ&hl=en

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=61477

UW history: Started as Assistant Professor in September 1996. Promoted to Associate Professor in 2000 and to Full Professor in 2007. Director of the Center for Statistics and the Social Sciences, 2009-2014. Chair since 2014.

Background: B.A. in Mathematics and Philosophy, University of Oxford, 1992. M.S. in Logic and Computation, 1995 and Ph.D. in Logic, Computation and Methodology of Science, 1996, Carnegie-Mellon University.

Selected Awards and Honors: Rosenbaum Fellow, Isaac Newton Institute, 1997; Fellow, Center for Advanced Studies in the Behavioral Sciences, Stanford, 2004; Fellowship, Institute for Advanced Studies, University of Bologna, 2007; Visiting Senior Research Fellow, Jesus College, Oxford, 2008; Fulbright Fellowship, Argentina, 2014; Amazon Scholar, 2019. Conference on Uncertainty in Artificial Intelligence (UAI): Best student paper award, 1996; Best student paper award (co-author), 2004; Best paper award, 2009.

Interests and Activities:
Research areas: Causal inference; multivariate statistics and graphical models; applications in artificial intelligence, epidemiology and social sciences.
Refereed Publications: 45 journal articles; 30 conference papers; 2 book chapters.
Grants: PI or co-PI on 11 federal grants.
Teaching: I have taught 10 different courses at UW. Average course evaluation: 4.5/5, since 2014.
PhD Advising: 12 PhD students at UW, 9 have gone on to tenure-track positions; one is an IMS Fellow.
Community Activities: Co-organizer, Oberwolfach workshop, May 2019.
Associate Editor: Statistical Science (2009-14), JRSS B (1999-04).
Conference Program Co-Chair: AI & Statistics 2000; UAI 2006.

E.20 Michele L. Shaffer

Lecturer, Part-time

Homepage: https://faculty.washington.edu/mshaff

Full CV: https://faculty.washington.edu/mshaff/CV.pdf

Link to Publications: https://scholar.google.com/citations?user=QDaQUTIAAAAJ&hl=en&oi=ao

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=77865

UW History: Started as Associate Professor of Pediatrics in September 2013. Transferred to Lecturer, Part-time of Statistics in September 2017.

Background: B.S. in Mathematics, 1996; M.S. in Statistics, 1999; and Ph.D. in Statistics, 2002, The Pennsylvania State University. Started as Assistant Professor of Public Health Sciences at Penn State College of Medicine in 2002. Promoted with tenure to Associate Professor in 2008. Appointed Adjunct Associate Professor of Public Health Sciences in 2017.

Selected Awards and Honors: Penn State University Fellow, 1997; Homeyer Graduate Fellowship, 1998; Dean's Award for Excellence in Teaching, Penn State College of Medicine, 2011.

Interests and Activities:
Research areas: Correlated data; study design; clinical trials; applications in pediatrics and geriatrics.
Publications: 119 refereed journal publications.
Grants: Co-Investigator or local PI on 26 federal grants.
Teaching: I teach statistical consulting at UW all quarters. Average course evaluation: 4.66/5, since 2017.
Community Activities: NICHD Pediatric Subcommittee Statistical Reviewer.

E.21 Werner Stuetzle

Professor of Statistics
Adjunct Professor of Computer Science and Engineering

Homepage: https://www.stat.washington.edu/wxs/

Full CV: https://www.dropbox.com/s/32d9apnfggmirit/cv-5-30-2018.pdf?dl=0

Link to publications:
https://scholar.google.com/citations?view_op=list_works&hl=en&user=SfXWL4AAAAAJ

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=18638

UW history: Associate Professor / Professor since 1984. Department Chair 1994-2002. Divisional Dean of Natural Sciences 2006-2016.

Background: M.S. in Mathematics, ETH Zurich, 1973. Ph.D. in Mathematics, 1977, ETH Zurich.

Interests and Activities:
Research areas: Nonparametric methods in multivariate analysis, machine learning.
Publications: 45 refereed journal or conference publications.
Grants: PI or co-PI on 12 federal grants.
Teaching: I have taught about 10 different courses at UW.
PhD Advising: Advisor for 8 Ph.D. students at UW.

E.22 Jon Wakefield

Professor of Statistics and Biostatistics

Homepage: http://faculty.washington.edu/jonno/index.html

Full CV: http://faculty.washington.edu/jonno/WakefieldCV-Oct-2018.pdf

Link to publications:
https://scholar.google.com/citations?user=mYyRi8sAAAAJ&hl=en

Math Genealogy:
https://www.genealogy.math.ndsu.nodak.edu/id.php?id=93471

UW history: Started as Associate Professor in October 1999. Promoted to Full Professor in 2000 in 2007. Acting Chair and Chair of Department of Statistics, 2009-2011. Currently Training Director of CSDE. Affiliate Member in the Vaccine and Infectious Disease Division at the Fred Hutchinson Cancer Research Center. Research Affiliate with the Center for Statistics and the Social Sciences (CSSS).

Background: B.Sc. in Mathematics with Statistics, University of Nottingham 1985. Ph.D. in Statistics, 1992, University of Nottingham.

Selected Awards and Honors: The Guy Medal in Bronze, The Royal Statistical Society, 2000. Fellow of the American Statistical Association, 2007,

Interests and Activities:
Research areas: Spatial epidemiology; Space-time models for infectious disease data; Small area estimation; Estimating child mortality in a low and medium income countries context; Hierarchical models for survey data; Estimating national and subnational disease burden; Ecological inference for non-infectious and infectious disease data; The links between Bayes and frequentist procedures.
Publications: 140 refereed journal publications; 27 book chapters.
Books: Wakefield, J.C. (2013). Bayesian and Frequentist Regression Methods. Springer. Elliott, P., Wakefield, J., Best, N.G. and Briggs, D. (2000). Spatial Epidemiology: Methods and Applications. Oxford University Press.
Grants: I have been PI on several NIH R01 awards.
Teaching: I have taught 14 different courses at UW.
PhD Advising: Advisor for 12 PhD students at UW, 6 at Imperial College.
External Activities: Member of the Technical Advisory Group of the UN Inter-agency Group for Child Mortality Estimation (IGME), National Academies of Science committee on "Cancer Risk Pilot Planning", 2013–2014; National Academies of Science committee, "Panel on Methods for Integrating Multiple Data Sources to Improve Crop Estimates", 2015–2017. Currently Moderator for arXiv. Formerly: Associate Editor: Statistical Science, Biometrics, Journal of the American Statistical Association, Genetics, Applied Statistics, Biostatistics

E.23 Jon A. Wellner

Professor of Statistics
Professor of Biostatistics

Homepage: https://www.stat.washington.edu/jaw/

Short CV: https://www.stat.washington.edu/jaw/jaw.shtvita.html

ORCID: https://orcid.org/0000-0001-9161-833X

Link to publications:
https://scholar.google.com/citations?user=5gnGSd8AAAAJ

Math Genealogy:
https://genealogy.math.ndsu.nodak.edu/id.php?id=22361

UW history: Started as Professor in September 1983.
Background: B.S. in Mathematics and Physics, University of Idaho, 1968. Ph.D. in Statistics, 1975, University of Washington.

Selected Awards and Honors: Alexander von Humboldt Foundation Fellow, 1980-1981; John Simon Guggenheim Foundation Fellow, 1987-1988; IMS Special Invited Lecture (now called Medallion Lectures), June, 1992; Knight of the Order of the Netherlands Lion, July 30, 2010; Alexander von Humboldt Foundation Research Prize, 2011-2012; Senior Noether Award, 2011; IMS Le Cam Lecture, IMS Meeting and JSM, Seattle, Washington, August, 2015; Lucien Le Cam Lecturer, Journee de Statistique, Societe Francais de Statistique, May 29 - June 2, 2017.

Interests and Activities:
Research areas: Empirical processes; asymptotic theory; semiparametric models; applications in biostatistics.
Publications: over 110 refereed journal or conference publications; 4 books .
Grants: PI or co-PI on 10+ federal grants.
Teaching: I have taught 13 different courses at UW. Average course evaluation: 4.7/5, since 2014.
PhD Advising: Advisor or co-advisor for 26 PhD students at UW, 14 of whom have gone on to tenure-track positions. One COPSS winner; five IMS Fellows.
Community Activities: IMS Program Secretary, 1995 - 1997; Editor, *Annals of Statistics*, 2001-2003; Editor, *Statistical Science*, 2011-2013; IMS Editor, *Statistics Surveys*, 2007 - 2009; IMS President 2017; Co-organizer Oberwolfach workshops, November 2006, October 2011.

E.24 Daniela M. Witten

Professor of Statistics and Biostatistics
Dorothy Gilford Endowed Chair in Mathematical Statistics

Homepage: http://www.faculty.washington.edu/dwitten

Full CV: http://www.faculty.washington.edu/dwitten/cv.pdf

Link to publications:
https://scholar.google.com/citations?user=bHZf-c8AAAAJ&hl=en

Math Genealogy:
http://www.genealogy.ams.org/id.php?id=145686

UW history: Started as Assistant Professor in September 2010. Promoted to Associate Professor in 2014 and to Full Professor in 2018. Dorothy Gilford Endowed Chair in Mathematical Statistics since 2018.

Background: B.A. in Mathematics and Biology, Stanford University, 2005. M.S. in Statistics, Stanford University, 2006. Ph.D. in Statistics, Stanford University, 2010.

Selected Awards and Honors: NDSEG Research Fellowship, 2006; Gertrude Cox Scholarship, 2008; David Byar Young Investigator Award, 2011; NIH Director's Early Independence Award, 2011; NSF CAREER Award, 2013; Sloan Research Fellowship, 2013; Raymond Carroll Young Investigator Award, 2015; Simons Investigator in Mathematical Modeling of Living Systems, 2018; Dorothy Gilford Endowed Chair in Mathematical Statistics, 2018; IMS Medallion Lecturer, 2020.

Interests and Activities:
Research areas: Statistical machine learning, with applications to genomics, neuroscience, and other fields. High-dimensional data, unsupervised learning, graphical modeling, convex optimization, changepoint detection.
Publications: 65 refereed journal publications; 3 refereed conference publications; 2 book chapters; co-author of textbook *Introduction to Statistical Learning*.
Grants: Currently PI of 3 NIH R01's, 1 NIH T32, NSF CAREER Award, Simons Investigator Award, totaling around $6M. Several current additional grants as co-I.
Teaching: I have taught 5 different courses at UW, spanning Stat/Biostat MS/PhD, Stat undergrad, and Biostat service teaching. My median teaching evaluations have been 4.6/5.0, 4.5/5.0, 4.5/5.0, 4.7/5.0, 4.0/5.0, 4.2/5.0, 4.9/5.0, 4.7/5.0, 4.6/5.0.
PhD Advising: Advisor for 4 completed PhD dissertations. 3 students are new faculty.
Associate Editorships: Biometrika (since 2011), JMLR (since 2018), JASA (2014-2017), JCGS (2011-2015)