



## PCC Proposal to Establish a Master of Science in Applied Political Analytics (PCC 19027)

**PRESENTED BY** Janna Bianchini, Chair, Senate Programs, Curricula, & Courses Committee

**REVIEW DATES** SEC – January 27, 2020 | SENATE – February 5, 2020

**VOTING METHOD** In a single vote

**RELEVANT POLICY/DOCUMENT** NA

**NECESSARY APPROVALS** Senate, President, University System of Maryland Board of Regents, and Maryland Higher Education Commission

### ISSUE

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The Department of Government and Politics (GVPT) and the Joint Program in Survey Methodology (JPSM), within the College of Behavioral and Social Sciences (BSOS), propose to establish a Master of Science in Applied Political Analytics. This program will prepare students for careers at the intersection of political science and data science. Empirical analysis in political science is entering a new era of Big Data where a broad range of data sources have become available to researchers. Examples include network data from political campaigns, data from social media generated by individuals, campaign contributions and lobbying expenditures made by firms and individuals, and international trade flows data. People planning to work in this field need two different sets of skills. They must have the technical background to work with data sets of an order of magnitude unimaginable to previous generations. Developing and working with social and behavioral data presents unique challenges in measurement design, data collection, ethics and governance, communication, data management, modeling, and analysis. They must also have a rich background in political science so that they can meaningfully apply these analytical skills to important policy questions and issues.

The proposed program consists of 12 three-credit courses (36 credits total). 18 credits will be provided by GVPT, and 18 credits will be provided by JPSM. GVPT courses include the following: Research Design for Political Analytics; Voting, Campaigns, and Elections, Coding in Statistical Software; Public Opinion; the Logic and Practice of Measurement; and National Security and International Relations. JPSM courses include the following: Statistical Modeling I; Statistical Modeling II; Fundamentals of Data Collection I; Questionnaire Design and Evaluation; Fundamentals of Computing and Data Display; and Fundamentals of Inference.

GVPT and JPSM together are particularly well situated to offer a graduate program in political analytics. Political science has become increasingly quantitative, and GVPT has in recent years developed an exciting and innovative undergraduate program that features several courses focused on data analysis related to political questions. These courses have become quite popular with GVPT undergraduates as they see them as providing clear skills that are attractive to employers. The expectation is that many of the students who will enroll in the master's program will come from the GVPT bachelor's program as part of a combined bachelor's/master's program that will be

proposed after the master's program is approved. With GVPT providing the foundations of political science and many of the students, JPSM, the nation's oldest and largest program focused on offering graduate training in the principles and practices of survey research, will provide coursework that enables students to delve more deeply into the technical aspects of data collection, survey methods, and statistical modeling. This technical training will allow students to stand out in a growing, but crowded, job market for political analysts.

The program will be self-supported through tuition revenue.

This proposal was approved by the Graduate School Programs, Curricula, and Courses committee on November 21, 2019, and the Senate Programs, Curricula, and Courses committee on December 6, 2019.

## **RECOMMENDATION(S)**

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The Senate Committee on Programs, Curricula, and Courses recommends that the Senate approve this new degree program.

## **COMMITTEE WORK**

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The committee considered this proposal at its meeting on December 6, 2019. Margaret Pearson, Professor and Interim Chair of Government and Politics, Chris Antoun, Assistant Research Professor in the Joint Program in Survey Methodology, and Wayne McIntosh, Associate Dean of the College of Behavioral and Social Sciences, presented the proposal and responded to questions from the committee. The proposal was approved by the committee.

## **ALTERNATIVES**

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The Senate could decline to approve this new degree program.

## **RISKS**

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If the Senate declines to approve this degree program, the university will lose an opportunity to offer a self-supported master's program that trains students to apply advanced data science skills to important political questions and issues.

## **FINANCIAL IMPLICATIONS**

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The advising, administrative, and instructional infrastructure already exist. Tuition revenue will be used to cover all program expenses and recoup an initial investment to start the program. Consequently, the program has no significant adverse financial implications.

University of Maryland PCC  
Program/Curriculum/Unit Proposal

PCC Log No: 19027

Program: Master of Science Degree in Applied Political Analytics  
Department/Unit: JPSM / CVPT  
College/School: BSCS

Proposal Contact Person (with email):

- Type of Action (check one):
- Curriculum change (includes modifying minors, concentrations/specializations and creating informal specializations)
  - Curriculum change is for an LEP Program
  - Rename a program or formal Area of Concentration
  - Establish/Discontinue a formal Area of Concentration
  - Other:
- Establish a new academic degree/certificate program
  - Create an online version of an existing program
  - Establish a new minor
  - Suspend/Discontinue a degree/certificate program
  - Establish a new Master or Certificate of Professional Studies program
  - New Professional Studies program will be administered by Office of Extended Studies

*Italics indicate that the proposal must be presented to the full University Senate for consideration.*

Approval Signatures - Please print name, sign, and date. For proposals requiring multiple unit approvals, please use additional cover sheet(s).

1. Department Committee Chair N/A
2. Department Chair Margaret Pearson 9-9-19 Margaret Pearson
3. College/School PCC Chair Kristi Hall 10/17/19 Kristi Hall
4. Dean [Signature] 10/17/19 Wayne McFadden
5. Dean of the Graduate School (if required) [Signature] 12/1/19
6. Chair, Senate PCC Janna Bianchini [Signature] 12-6-19
7. University Senate Chair (if required) \_\_\_\_\_
8. Senior Vice President and Provost \_\_\_\_\_

Instructions:  
When approved by the dean of the college or school, please send the proposal and signed form to the Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus-5031, and email the proposal document as an MSWord attachment to [pcc-submissions@umd.edu](mailto:pcc-submissions@umd.edu).

Summary of Proposed Action (use additional sheet if necessary):

Unit Code(s) (to be entered by the Office of Academic Planning and Programs):

University of Maryland PCC  
Program/Curriculum/Unit Proposal

PCC Log No: \_\_\_\_\_

Program: Master of Science Degree in Applied Political Analytics

Department/Unit: Joint Program in Survey Methodology / CVPT

College/School: BSOS

Proposal Contact Person (with email): Frauke Kreuter fkreuter@umd.edu

- Type of Action (check one):
- Curriculum change (includes modifying minors, concentrations/specializations and creating informal specializations)
    - Curriculum change is for an LEP Program
    - Rename a program or formal Area of Concentration
    - Establish/Discontinue a formal Area of Concentration
    - Other: \_\_\_\_\_
  - Establish a new academic degree/certificate program
    - Create an online version of an existing program
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Approval Signatures - Please print name, sign, and date. For proposals requiring multiple unit approvals, please use additional cover sheet(s).

1. Department Committee Chair N/A

2. Department Chair Frauke Kreuter Digitally signed by Frauke Kreuter  
Date: 2019.09.09 22:17:03 +02'00'

3. College/School PCC Chair Kristi Hall Kristi Hall 10/17/19

4. Dean [Signature] 10/17/19 Wayne McIntosh

5. Dean of the Graduate School (if required) \_\_\_\_\_

6. Chair, Senate PCC \_\_\_\_\_

7. University Senate Chair (if required) \_\_\_\_\_

8. Senior Vice President and Provost \_\_\_\_\_

**Instructions:**

When approved by the dean of the college or school, please send the proposal and signed form to the Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus-5031, and email the proposal document as an MSWord attachment to [pcc-submissions@umd.edu](mailto:pcc-submissions@umd.edu).

Summary of Proposed Action (use additional sheet if necessary):

Unit Code(s) (to be entered by the Office of Academic Planning and Programs):

**Program: Master of Science Degree in Applied Political Analytics**

**Date of Proposal:**

**Start Term for New Program: Fall 2020**

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A new degree program proposal will need to be approved not just by campus but also by the University System of Maryland (USM) Board of Regents and the Maryland Higher Education Commission (MHEC). New certificate programs need to be approved by the USM Chancellor and MHEC. The following prompts are based on academic policies for programs and reflect campus requirements and MHEC requirements. The prompts also include questions frequently asked by review committees. See [http://mhec.maryland.gov/institutions\\_training/Pages/acadaff/AcadProgInstApprovals/NewAcademicProgramProposals.aspx](http://mhec.maryland.gov/institutions_training/Pages/acadaff/AcadProgInstApprovals/NewAcademicProgramProposals.aspx) for more information about MHEC requirements. Please feel free to add additional information at the end of this document or in a separate appendix.

**Mission and Purpose**

**1. Describe the program and explain how it fits the institutional mission statement and planning priorities. The University Mission Statement and Strategic Plan can be found on this site: <https://www.umd.edu/history-and-mission>.**

The Department of Government and Politics (GVPT) and the Joint Program in Survey Methodology (JPSM) are proposing the development of a joint Master of Science Degree in Applied Political Analytics. This program will prepare students for careers at the intersection of political science and data science. Empirical analysis in political science is entering a new era of Big Data where a broad range of data sources have become available to researchers. Examples include network data from political campaigns, data from social media generated by individuals, campaign contributions and lobbying expenditures made by firms and individuals, and international trade flows data. How can we take advantage of these new data sources and improve our understanding of politics?

The proposed program supports two particular elements of the University' Mission Statement. First, the Mission Statement stresses the importance of multi-disciplinary approaches and says in part that the University "... is at the forefront of advanced knowledge in areas that increasingly depend on multi-disciplinary approaches, including energy, the environment, health, climate change, food safety, security, and information sciences." Second, the Mission Statement lists among its objectives for graduate education "Expand excellent professional graduate programs that are nationally recognized for their contributions to the practice of the professions, for their pioneering curricula, and for their spirit of innovation and creativity."

The proposed program is at its heart multi-disciplinary. People planning to work in this field need two different sets of skills. They must have the technical background to work with data sets of an order of magnitude unimaginable to previous generations. Developing and working with social and behavioral data presents unique challenges in measurement design, data collection, ethics and governance, communication, data management, modeling, and analysis. They must also have a rich background in political science so that they can meaningfully apply these analytical skills to important policy questions and issues.

The proposed program is a pioneering effort. There are only a handful of programs that train graduate students to work at the intersection of political science and data science. We expect the proposed program to be recognized quickly as a leading program in this growing field.

GVPT and JPSM are particularly well qualified to offer a graduate program in political analytics. GVPT has developed an exciting and innovative undergraduate program in quantitative analysis of politics. They offer a variety of courses for students who desire more rigorous training in data analytics within the major. A recent external review of the department was particularly impressed that these courses both teach and require programming in R, a skill that students recognize will give them an advantage in future careers. The external review committee argued that few other major departments offer a similarly developed array of courses in methods at the undergraduate level.

JPSM is the nation's oldest and largest program originally focused on offering graduate training in the principles and practices of survey research. Over the last years the scope within JPSM has dramatically increased to include administrative data and other digital trace. Studying errors and biases in the process of collecting such data, creating measurements from those data, and developing methods to analyze these data by themselves and in conjunction with survey data is now an added focus. This also opens the door to further collaboration with experts in data curation, management and access. JPSM has a core group of five faculty with partial appointments in departments in BSOS such as Sociology and Economics as well as Departments outside of BSOS such as Mathematics and Biostatistics.

### **Program Characteristics**

**2. Provide the catalog description of the proposed program. As part of the description, please indicate any areas of concentration or specializations that will be offered.**

The Master of Science Degree in Applied Political Analytics is offered jointly by the Department of Government and Politics and the Joint Program in Survey Methodology. The program provides advanced training in the application of data science to the analysis of key issues in political science. The program will prepare students for careers in the private sector, research centers, NGO's, and federal, state, and local government agencies.

The Master of Science in Applied Political Analytics consists of 18 credits in political science and 18 credits in data science. Students will complete a major project in one of their courses that will give them the opportunity to apply the core skills that they have acquired in the program to address real-world problems.

**3. What are the educational objectives of the program?**

The curriculum will include graduate courses in the Department of Government and Politics and the Joint Center for Survey Methodology. The proposed curriculum has been designed to meet five objectives:

- Provide a more rigorous theoretical background in at least one major sub-field in political science.
- Enhance a student's existing understanding of political analysis (from undergraduate coursework) with a rigorous introduction to additional analytical tools
- Provide a venue for students to practice theoretically rigorous political analysis with their expanded tool set.
- Provide a rigorous understanding of the fundamentals of data science.
- Introduce students to the key tools of "Big Data" collection, management, and analysis.

**4. Describe any selective admissions policy or special criteria for students interested in this program.**

We expect most students to enroll in this program as part of a 4+1 joint Bachelor's/Master of Science program in Applied Political Analytics. GVPT and JPSM plan to submit a separate PCC proposal for this program and we will outline the admissions policy for 4+1 students in that proposal.

Students who do not apply to the 4+1 program must meet the admissions criteria as established by the Graduate School:

- Applicants must have earned a four-year baccalaureate degree from a regionally accredited U.S. institution, or an equivalent degree from an institution outside the U.S.
- Applicants must have earned a 3.0 GPA (on a 4.0 scale), or the equivalent on other scales, in all prior undergraduate and graduate coursework.
- Applicants must provide an official copy of transcripts for all of their post-secondary work.
- International students must fulfill all requirements relating to international academic credentials, evidence of English proficiency, and financial certification. These requirements are available on the Graduate School's web site <https://gradschool.umd.edu/admissions/international-admissions>.

Applicants to the program must meet the following additional requirements:

- Complete the following undergraduate coursework
  - GVPT 422 Quantitative Politics Analysis or an equivalent course on quantitative methods of data analysis in the social sciences
  - At least two additional quantitative methods courses that focus on data analysis in the social sciences. University of Maryland GVPT graduates can satisfy this requirement by completing two of the following three courses:
    - GVPT 420: The Logic and Practice of Measuring Political Behavior
    - GVPT 421: Advanced Quantitative Methods
    - GVPT 424: Quantitative Study of International Relations
- Complete an essay describing the applicant's experience and interest in politics and data science.
- Submit two letters of recommendation.
- Submit results from the Graduate Record Examination General test.

**5. Indicate the course requirements with course numbers, titles and credits. If applicable, indicate if any course will also count for a general education requirement. In an appendix, provide the course catalog information (credits, description, prerequisites, etc.) for all of the courses. Note that suffixed "selected" or "special" topics courses should be avoided. If suffixed-selected or special topics courses are offered regularly in the new program, you should make the courses permanent. Also, please review the basic requirements of degree programs or certificate programs to ensure that they meet the minimum policy requirements.**

**Please note: new courses or modifications to courses need to be submitted through the Testudo Curriculum Management system and will need to follow the normal VPAC course proposal review process. You may submit individual course changes to VPAC concurrently with the PCC proposal; however, the course changes may be held depending on the outcome of the PCC proposal.**

Students in this program will be required to take 12 three-credit courses. GVPT will develop six new courses to be included in the program; the department will develop separate proposals for those courses. Initially, JPSM will include students in this program in its existing graduate courses. As the program grows, JPSM will offer separate sections of those courses for students in this program. Both units plan to add additional courses to the program as the program expands so that students have the opportunity to choose courses that best meet their education objectives.

GVPT6xx	Research Design for Political Analytics
GVPT6xx	Voting, Campaigns, and Elections
GVPT6xx	Coding in Statistical Software
GVPT6xx	Public Opinion
GVPT6xx	The Logic and Practice of Measurement
GVPT6xx	National Security and International Relations
SURV615	Statistical Modeling I
SURV616	Statistical Modeling II
SURV621	Fundamentals of Data Collection I
SURV630	Questionnaire Design and Evaluation
SURV727	Fundamentals of Computing and Data Display
SURV740	Fundamentals of Inference

Catalog information for all of these courses is included in Appendix A to this proposal.

**6. Summarize the factors that were considered in developing the proposed curriculum (such as recommendations of advisory or other groups, articulated workforce needs, standards set by disciplinary associations or specialized-accrediting groups, etc.).**

The field of Political Science has become increasingly quantitative, and GVPT has in recent years added several courses focused on analysis of data related to political questions. These courses have become quite popular with GVPT students as they see them as providing clear skills that are attractive to employers. GVPT alumni have indicated in several cases that they have gotten jobs based on the skills they acquired in these types of classes. In the Spring of 2018, GVPT had an external review and the external review committee commended the department in its strength in undergraduate instruction in political methodology and encouraged further development in that area.

Employers across the government, private, and non-profit sectors increasingly understand that data can help them reach their organizations' goals. In a 2017 report from LinkedIn<sup>1</sup>, data related jobs were prominent among the top 10 fastest growing jobs. The report also indicates that data scientist positions have shown a 650% rate of growth and large shortage of qualified applicants to fill those jobs. In the campaign world alone, the last several election cycles have seen a proliferation of new companies specializing in data analytics and existing firms adding capacity in this area.

Whether it is understanding which message to use to encourage a citizen to register to vote or what services are needed to support programs to reduce radicalization among at-risk youth, data driven strategies are a key to success. In order to be most effective, the workforce needs more than just technical skills. That is, with a firm foundation in the theoretical and empirical research the most successful employees will be able to communicate more effectively with clients and adapt to new questions and issues as they arise. The MS in Political Analytics program is designed to provide students with this foundation.

<sup>1</sup> <https://economicgraph.linkedin.com/research/LinkedIns-2017-US-Emerging-Jobs-Report> last visited 12/5/18.



**7. Sample plan. Provide a term by term sample plan that shows how a hypothetical student would progress through the program to completion. It should be clear the length of time it will take for a typical student to graduate. For undergraduate programs, this should be the *four-year plan*.**

GVPT and JPSM are developing a proposal to incorporate the MS in Political Analytics in a combined Bachelor's/MS program (i.e., a 4 + 1). We expect most of the students in this program will be 4 + 1 students who will begin the program in their senior year. We expect them to take four courses while still undergraduates and to then complete the program in two semesters by taking four courses per semester. A sample program for those students would be as follows:

- Year 1 (senior year for 4 + 1 students)
  - GVPT6xx Research Design for Political Analytics
  - GVPT6xx Coding in Statistical Software
  - SURV615 Statistical Modeling I
  - SURV621 Fundamentals of Data Collection I
  
- Year 2 (5<sup>th</sup> year for 4 + 1 students)
  - GVPT6xx Public Opinion
  - GVPT6xx Voting, Campaigns, and Elections
  - GVPT6xx The Logic and Practice of Measurement
  - GVPT6xx National Security and International Relations
  - SURV616 Statistical Modeling II
  - SURV630 Questionnaire Design and Evaluation
  - SURV727 Fundamentals of Computing and Data Display
  - SURV740 Fundamentals of Inference

We anticipate some students will start the Master of Science Degree in Applied Political Analytics after completing their undergraduate degrees. Those students could complete the program in three semesters of full-time course work. We expect some people will pursue this degree as part-time students while continuing to work. The program is flexible and can accommodate those students. If students take two courses each semester they will complete the program in three academic years. They will be able to accelerate their progress if JPSM and GVPT decide to offer some courses during the summer as the program grows.

**8. Indicate whether the program will be offered either online or off-campus. Please note that MHEC requires a separate proposal for off-campus delivery. If the program will be offered exclusively online or will have both a face-to-face and online version of the program, please complete this additional form and add as an appendix:**

<https://docs.google.com/document/d/1ojpUBt4mAWINPCiQNzZ48UH68zGPYj31TPgEOfW3q1E/>

All of the courses in the proposed program will be taught at the College Park campus. The courses taught by JPSM will take advantage of its video conferencing technology to link College Park classrooms with its partners, the University of Michigan and Westat.

**9. If the program will be offered in a non-semester format, identify the term structure that will be used for the program:**

- **Approved Campus 12-Week Term (see Academic Calendars)**
- **\*Non-Standard Term**

**\*If you are using a non-standard term structure, indicate whether relevant offices, such as the Registrar's Office and International Scholar & Student Services, have been notified and support the program. Non-standard terms need to fit within the university's scheduling system calendar, and non-standard terms need to work with international student visa requirements.**

**Term structure:** The program will be offered in a traditional semester format.

**10. For Master's degree programs, describe the thesis requirement and/or the non-thesis requirement.**

The program will not have a thesis requirement.

**11. List the intended student learning outcomes. In an appendix, provide the plan for assessing these outcomes.**

The Master of Science in Applied Political Analytics Program has five learning outcomes, which are listed below:

- Provide a more rigorous theoretical background in at least one major sub-field in political science.
- Enhance a student's existing understanding of political analysis (from undergraduate coursework) with a rigorous introduction to additional analytical tools
- Provide a venue for students to practice theoretically rigorous political analysis with their expanded tool set.
- Provide a rigorous understanding of the fundamentals of data science.
- Introduce students to the key tools of "Big Data" collection, management, and analysis.

In one of the substantive political science courses the students will take toward the end of the program (Public Opinion, Voting, Campaigns, and Elections, The Logic and Practice of Measurement, and National Security and International Relations), they will complete a major final project which demonstrates each of these skills. We will assess all student's achievement of these learning outcomes each year.

A faculty committee that oversees the Master of Science in Applied Political Analytics program, led by a full professor, will develop rubrics which will be used to assess student mastery of each of these learning objectives. Faculty members will then use the rubric to assess each major project produced in each academic year. The rubric will contain categories related to the specific learning outcome and students will be assessed as "Advanced," "Proficient," "Developing" or "Novice" in each category. The individual categories will be

aggregated to produce an overall score. Our overall goal is that 80% of the students are scored as “Advanced” or “Proficient” on the learning outcome assessed.

This assessment will be conducted annually. We will assess 1-2 learning outcomes per year, and every outcome will be assessed at least every four years.

The results of this assessment will be discussed in the faculty committee, as well as among the faculty of GVPT and JPSM. We will use this discussion to continually improve the overall curriculum and the content of the specific courses offered within the MS degree to enhance student learning.

**12. Identify specific actions and strategies that will be utilized to recruit and retain a diverse student body.**

GVPT, JPSM, and the College of Behavioral and Social Sciences more broadly are committed to the recruitment, retention and professional development among members of minority groups, and to increase graduation rates of diverse student populations. We will work closely with the BSOS Assistant Dean for Diversity Kim Nickerson to develop programs and strategies to advance our diversity objectives. Our diversity plans will include, for example,

- Working closely with campus minority student groups so that students from groups that are under-represented in political science are aware of our program.
- Developing a program to match students with faculty mentors.
- Reaching out to Historically Black Colleges and Universities and other schools with significant numbers of minority undergraduates.
- Taking advantage of the American Political Science Association’s many programs to promote diversity.

The Department of Government and Politics and the Joint Program in Survey Methodology are committed to supporting students and ensuring a fear-free, inclusive space where all students can thrive. GVPT and JPSM recognize non-binary gender identifications, as well as the difference between assigned biological sex and gender expression. They encourage students, faculty, and staff to share and honor preferred pronouns and names.

**Relationship to Other Units or Institutions**

**13. If a required or recommended course is offered by another department, discuss how the additional students will not unduly burden that department’s faculty and resources. Discuss any other potential impacts on another department, such as academic content that may significantly overlap with existing programs. Use space below for any comments. Otherwise, add supporting correspondence as an appendix.**

There are no required or recommended courses in this program offered by another department.

**14. Accreditation and Licensure. Will the program need to be accredited? If so, indicate the accrediting agency. Also, indicate if students will expect to be licensed or certified in order to engage in or be successful in the program's target occupation.**

This program will not need to be accredited.

**15. Describe any cooperative arrangements with other institutions or organizations that will be important for the success of this program.**

There will not be any cooperative arrangements with other institutions

### **Faculty and Organization**

**16. Faculty and organization. Who will provide academic direction and oversight for the program? As an appendix, please indicate the faculty involved in the program. Include their titles, credentials, and courses they may teach for the program. Please also describe the unit's faculty training practices.**

The proposed program will be administered by the campus Office of Extended Studies.

GVPT and JPSM will choose a program director from their tenured faculty. The GVPT director of graduate studies will initially serve as director. We will also form an advisory board for the program that will include at least one faculty member from GVPT and one faculty member from JPSM, a current student in the program, and one or more members from outside the university. The outside members will be from institutions that employ people with the skills and background of the graduates of the proposed program.

The program will hire Professional Track (PTK) Faculty who will be responsible for teaching in the program. We will assess the need for Teaching Assistants in these courses based on the number of students enrolled in the program and the subject matter in each individual course. We anticipate that a number of courses will be taught by recent GVPT PhD's. Initially we will include students in this program in current JPSM 600-level classes. JPSM will add additional sections of those classes as this program grows.

The College of Behavioral and Social Sciences (BSOS) and the College of Information Science (the iSchool) recently announced the creation of the Center for the Advances in Data and Measurement (CADM). The proposed Master of Science Degree in Applied Political Analytics will benefit greatly from CADM.

CADM has three objectives:

- Develop the university's capacity to conduct contract and applied research in data science and measurement in support of social science and related areas.
- Recruit, retain, and support the work of leading scholars from diverse disciplines who produce high impact data science and measurement research in support of social sciences.
- Educate the next generation of researchers and data scientists onsite and through long distance education for careers such as survey methodologists, political analysts, quantitative sociologists, applied economists, computational criminologists, social media analysts, data journalists, city planners.

CADM will continue all of JPSM's graduate programs including its PhD in Survey Methodology, Master's in Survey Methodology (to be renamed Master's in Data Management), International Program in Survey and Data Science, and its certificates in Survey Methodology and Survey Statistics. It will also administer the iSchool's Master's in Information Management program. CADM will have an excellent infrastructure to administer the proposed program. CADM administrators and faculty have extensive experience with a broad range of graduate level programs.

### **Resource Needs and Sources**

**17. Each new program is required to have a library assessment prepared by the University Libraries in order to determine any new library resources that may be required. Please contact the University Libraries staff person who is your departmental/programmatic liaison or Daniel Mack at [dmack@umd.edu](mailto:dmack@umd.edu), Associate Dean of Collections, to request a library assessment that will be added as an appendix. Please note that this assessment must be done by the University Libraries.**

Please see the library assessment we have included in Appendix B to this proposal.

**18. Discuss the adequacy of physical facilities, infrastructure and instructional equipment.**

The proposed program will not lead to any additional burdens on existing physical facilities, infrastructure, or instructional equipment.

**19. Discuss the instructional resources (faculty, staff, and teaching assistants) that will be needed to cover new courses or needed additional sections of existing courses to be taught. Indicate the source of resources for covering these costs.**

We plan to use the tuition revenue to offset the cost of hiring instructors and adjunct faculty, graduate assistants, and a part-time advisor. It is understood that the proposed program will not receive any tuition if undergraduates take courses in the program as part of a 4+1 bachelor's degree and master's degree.

**20. Discuss the administrative and advising resources that will be needed for the program. Indicate the source of resources for covering these costs.**

We do not anticipate the proposed program placing significant additional burdens on the CADM, JPSM, and GVPT administrative infrastructure. We will pay for a part-time advisor from the revenue generated by the program (please see our response to question 19).

**21. The Maryland Higher Education Commission (MHEC) commission requires financial tables to describe the program’s financial plan for the next five years. Please consult with our office before completing these templates:**

**<https://docs.google.com/spreadsheets/d/1V6iSZG05edMitWP6CAOXjCoGO58Gf6VXxPaacKfrhZ4/edit#gid=0>. Once finalized in consultation with our office, these tables must be added as attachments. Use the space below for any additional comments on program funding.**

Please see the financial tables we have included in Appendix C to this proposal.

**Implications for the State (Additional Information Required by MHEC and the Board of Regents)**

If the proposed program is for a Post-Baccalaureate Certificate that is derived entirely from existing courses within an existing Master’s degree program, then you **only** need to respond to prompts 22 (on market demand) and 25 (curriculum of current master’s degree program).

**22. Explain how there is a compelling regional or statewide need for the program. Argument for need may be based on the need for the advancement of knowledge and/or societal needs, including the need for “expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education.” Also, explain how need is consistent with the Maryland State Plan for Postsecondary Education.**

Not surprisingly, the Washington DC area is extremely attractive to people who are interested in careers in politics or public policy. Their plans might include, for example, positions on Capitol Hill or in an NGO such as the World Bank or International Monetary Fund, a research organization such as the Brookings Institution, a political campaign, or one of the federal agencies.

Many, however, will find it difficult to stand out in a crowded job market. And the market is indeed crowded; each year US colleges and universities grant degrees to more than 160,000 undergraduates who majored in one of the social sciences or history. The proposed MS in Political Analytics will give people valuable marketable skills that will give them a significant competitive advantage in the Washington market. Many people are interested in politics and public policy. Graduates of the proposed program will be very well positioned to compete for jobs in those areas.

**23. Present data and analysis projecting market demand and the availability of openings in a job market to be served by the new program. Possible sources of information include industry or disciplinary studies on job market, the USBLS Occupational Outlook Handbook, or Maryland state Occupational and Industry Projections over the next five years. Also, provide information on the existing supply of graduates in similar programs in the state (use MHEC’s Office of Research and Policy Analysis webpage for Annual Reports on Enrollment by Program) and discuss how future demand for graduates will exceed the existing supply. As part of this analysis, indicate the anticipated number of students your program will graduate per year at steady state.**

The U.S. Bureau of Labor Statistics (BLS) estimates that employment in mathematical science occupations is projected to grow 27.9 percent from 2016 to 2026, much faster than the average for all occupations, resulting in about 50,400 new jobs. Three of the four detailed occupations that comprise this broader employment category are expected to be among the top 30 fastest growing occupations through 2026.<sup>2</sup> BLS classifies data scientists as statisticians; BLS estimates that the demand for statisticians will grow by 34 percent in the 2016-2026 period. With the explosion of data across all industries, it’s not surprising that data scientist has topped the list of best

<sup>2</sup> See <https://www.bls.gov/opub/btn/volume-7/big-data-adds-up.htm>.

jobs in America for three straight years, with a median base salary of \$110,000 and more than 4,500 job openings, according to Glassdoor's 2018 50 Best Jobs in America report.

In March 2018, the Department of Government & Politics distributed a survey to GVPT majors enrolled in 300 and 400-level courses (586 unique students) asking about their interest in a program like the one proposed here. Eighty-six students took the survey, with 63 completing all questions. The students were primarily juniors (38%) and seniors (33%). Respondents were asked to rate the importance of a set of skills to achieving their career objectives, including data analysis, research design, questionnaire design, public speaking, and writing. The majority of students recognized data analysis and research design skills, the core components of the proposed program as important for their career objectives. With regard to data analysis skills, 46% of the respondents indicated these skills were "extremely important" and another 24% said they were "very important." Additionally, 39% responded that research design was extremely important, with another 31% indicating these skills were "very important."

We also asked respondents about the likelihood that they would enroll in a graduate program in Political Analytics like the one we are proposing. Seniors were asked how likely they would have been to enroll, the other respondents were asked how likely they would be to enroll. Thirty-seven percent of the respondents indicated they would be "very likely" to enroll; 38% said "somewhat likely" and 14% were undecided. Overall, this survey suggests that GVPT students see gaining data analysis skills as important to their career objectives and are interested in a graduate program like the MS in Political Analytics.

**24. Identify similar programs in the state. Discuss any differences between the proposed program and existing programs. Explain how your program will not result in an unreasonable duplication of an existing program (you can base this argument on program differences or market demand for graduates). The MHEC website can be used to find academic programs operating in the state: [http://mhec.maryland.gov/institutions\\_training/pages/HEPrograms.aspx](http://mhec.maryland.gov/institutions_training/pages/HEPrograms.aspx).**

There are data science graduate programs in the state and the Washington, DC area but none are directly comparable to the proposed program.

- Johns Hopkins offers an online and an online/on-site master's degree program in data science. Their program does not include an option to work at the intersection of political science and data science.
- George Washington's Master's in Data Science would allow a student to take at most two courses in political science.
- Georgetown's Master of Science in Analytics does not include an option to take coursework in political science.
- American University's Master of Data Science does have an option to focus on the application of data science to public policy and politics and so is closest in design to the proposed program. Given the well-recognized strengths of GVPT and JPSM we are confident we can compete effectively with the American University program.
- The MS in Business Analytics at the Robert H. Smith School of Business and UMBC's and Loyola data science programs are focused almost exclusively on business applications of data science.

**25. Discuss the possible impact on Historically Black Institutions (HBIs) in the state. Will the program affect any existing programs at Maryland HBIs? Will the program impact the uniqueness or identity of a Maryland HBI?**

The proposed program will have little or no impact on Maryland's Historically Black Institutions. Bowie recently received a \$400,000 NSF grant to incorporate data science in its undergraduate program. The grant is likely to lead Maryland's first undergraduate certificate program in data science analytics. We do not believe Bowie State plans to develop a graduate program in data science. Morgan State has a multidisciplinary bioinformatics program that is quite different from the program proposed here.

**26. For new Post-Baccalaureate Certificates derived from existing master's programs only, include the complete curriculum of the existing master's program.**

Not applicable.



## **Appendix A Course Descriptions**

### **GVPT6xx: Research Design for Political Analytics (3 credits)**

This course will introduce students to the empirical research techniques used in political science. Students will explore the core questions that motivate political science research and the approaches used to answer those questions. Students will understand when and how to implement research designs that utilize experiments, surveys, case studies, historical data, and administrative data.

### **GVPT6xx: Coding in Statistical Software (3 credits)**

This course will introduce students to different statistical software packages used in empirical political research and which they will use in later substantive courses. Students will receive instruction in beginning programming in these packages, which will be STATA and R.

### **GVPT6xx: Public Opinion (3 credits)**

This course will investigate how citizens in a democracy think about politics, form attitudes, and how public opinion shapes and is shaped by the political environment. While being exposed to core debates in public opinion and the study of public opinion, students will use a number of surveys that have been central to advancing our knowledge of public opinion.

### **GVPT6xx: Voting, Campaigns, and Elections (3 credits)**

This course will introduce students to the theoretical and empirical research on political participation, campaigns, and elections. By gaining an understanding of the literature and working with a variety of data sets, including surveys and voter history files, students will be equipped to carry out their own research on these topics.

### **GVPT6xx: The Logic and Practice of Measurement (3 credits)**

This course will introduce students to core concepts necessary to measure political behavior. Students will learn to take ideas from the concept stage to measurement of the concepts as part of a research design to answer theoretically motivated questions about political behavior and other political activity.

### **GVPT6xx: National Security and International Relations (3 credits)**

This course will introduce students to key areas of research in national security and international relations. Students will learn the major approaches to empirical research on national and international security and work with datasets focused on terrorist attacks and civil conflict.

### **SURV615: Statistical Methods I (3 credits)**

The purpose of this class is to learn basic statistical methods through the use of linear model theory and regression. Particular topics covered include one- and two-sample t-tests, multiple linear regression, analysis of variance, regression diagnostics, model-building techniques, random effects models, and mixed models. The emphasis will be to understand and apply the methods presented, and develop a feel for how problems in data analysis can be viewed in several different ways. In all cases the emphasis will be on understanding the techniques, rather than deriving their theoretical properties. The student will be expected to apply the techniques on weekly homework assignments, a midterm project, and a final project.

### **SURV616: Statistical Methods II (3 credits)**

Builds on the introduction to linear models and data analysis provided in Statistical Methods I. Topics include: Multivariate analysis techniques (Hotelling's T-square, Principal Components, Factor Analysis, Profile Analysis, MANOVA); Categorical Data Analysis (contingency tables, measures of association, log-linear models for counts, logistic and polytomous regression, GEE) and Lifetime Data Analysis (Kaplan-Meier plots, logrank tests, Cox regression).

### **SURV621: Fundamentals of Data Collection I (3 credits)**

This course is the first semester of a two-semester sequence that provides a broad overview of the processes that generate data for use in social science research. Students will gain an understanding of different types of data and how they are created, as well as their relative strengths and weaknesses. A key distinction is drawn between data that are designed, primarily survey data, and those that are found, such as administrative records, remnants of online transactions, and social media content. The course combines lectures, supplemented with assigned readings, and practical exercises. In the first semester, the focus will be on the error that is inherent in data, specifically errors of representation and errors of measurement, whether the data are designed or found. The psychological origins of survey responses are examined as a way to understand the measurement error that is inherent in answers. The effects of the mode of data collection (e.g., mobile web versus telephone interview) on survey responses also are examined.

### **SURV630: Questionnaire Design and Evaluation (3 credits)**

This course focuses on the development of the survey instrument, the questionnaire. Topics include wording of questions (strategies for factual and non-factual questions), cognitive aspects, order of response alternatives, open versus closed questions, handling sensitive topics, combining individual questions into a meaningful questionnaire, issues related to question order and context, and aspects of a questionnaire other than questions. Questionnaire design is shown as a function of the mode of data collection such as face-to-face interviewing, telephone interviewing, mail surveys, diary surveys, and computer-assisted interviewing.

### **SURV727: Fundamentals of Computing and Data Display (3 credits)**

Empirical social scientists are often confronted with a variety of data sources and formats that extend beyond structured and handleable survey data. With the emergence of Big Data, especially data from web sources play an increasingly important role in scientific research. However, the potential of new data sources comes with the need for comprehensive computational skills in order to deal with loads of potentially unstructured information. Against this background, the first part of this course provides an introduction to web scraping and APIs for gathering data from the web and then discusses how to store and manage (big) data from diverse sources efficiently. The second part of the course demonstrates techniques for exploring and finding patterns in (non-standard) data, with a focus on data visualization. Tools for reproducible research will be introduced to facilitate transparent and collaborative programming. The course focuses on R as the primary computing environment, with excursus into SQL and Big Data processing tools.

### **SURV740: Fundamentals of Inference (3 credits)**

This course is one of the fundamental 3 courses required by all students in the Master's Program in Survey Methodology, and focuses on the fundamentals of statistical inference in the finite population setting.

The course is design to overview and review fundamental ideas of making inferences about populations. It will emphasize the basic principles of probability sampling; focus on differences between making predictions and making inferences; explore the differences between randomized study designs and observational studies;

consider model-based vs. design-based analytic approaches; review techniques designed to improve efficiency using auxiliary information; and consider non-probability sampling and related inferential techniques.

## Appendix B Library Assessment

DATE: July 19, 2019  
TO: Robert Schwab  
Professor Emeritus  
Department of Economics  
FROM: On behalf of the University of Maryland Libraries:  
Judy Markowitz, Librarian for Government & Politics, Public Policy, Women's Studies,  
LGBT Studies  
Maggie Saponaro, Director of Collection Development Strategies  
Daniel Mack, Associate Dean, Collection Strategies & Services  
RE: Library Collection Assessment for MS in Applied Political Analytics

We are providing this assessment in response to a proposal by the Department of Government and Politics (GVPT) and the Joint Program in Survey Methodology (JPSM) to create the Master of Science in Applied Political Analytics. GVPT and JPSM asked that we at the University of Maryland Libraries assess our collection resources to determine how well the Libraries support the curriculum of this proposed program.

### **Journals**

The University of Maryland Libraries currently subscribe to many scholarly journals—almost all in online format--that focus on Political Science and Data Science.

The Libraries subscribe to all of the top ranked journals listed in the Political Science and Social Sciences, Mathematical Methods categories in the Social Sciences Edition/Science Edition of *Journal Citation Reports*. \*  
The following titles are the top ten titles for those categories, all of which are available online:

### **Political Science**

- International Organization
- American Journal of Political Science
- Political Communication (embargo on the most recent 18 months. use ILL)
- British Journal of Political Science
- Policy Studies Journal
- Annual Review of Political Science
- American Political Science Review
- Environmental Politics
- Journal of Democracy
- Governance: An International Journal of Policy, Administration and Institutions

### **Social Sciences, Mathematical Methods**

- Structural Equation Modeling: A Multidisciplinary Journal
- Econometrica: Journal of the Econometric Society
- Review of Economics and Statistics
- EPJ Data Science
- Sociological Methods & Research
- Journal of Mathematical Psychology
- Psychometrika

- Journal of Business & Economic Statistics
- Risk Analysis
- Mathematical Finance

In addition, we also subscribe to the top tier titles in the categories of Mathematics and Statistics & Probability. \*Note: *Journal Citation Reports* is a tool for evaluating scholarly journals. It computes these evaluations from the relative number of citations compiled in the *Science Citation Index* and *Social Sciences Citation Index* database tools.

**Databases**

The Libraries' *Database Finder* (<http://www.lib.umd.edu/dbfinder>) resource offers online access to databases that provide indexing and access to scholarly journal articles and other information sources such as congressional publications and statistics. Databases that provide access to materials relevant to the fields in the proposed program include but are not limited to:

**Government and Politics:**

- Academic Search Ultimate
- Almanac of American Politics
- America. History and Life
- CQ Almanac
- CQ Committee Coverage
- CQ Congress Collection
- CQ Voting and Elections Collections
- Congressional Publications
- Cross-National Time Series-Data Archive
- EconLit
- Historical Statistics of the United States
- International Political Science Abstracts
- JSTOR
- National Journal Policy Database
- Oxford Handbooks Online: Political Science
- PAIS
- Politics in America
- Project Muse
- Proquest Legislative Insight
- Roper iPOLL
- SocINDEX
- Worldwide Political Science Abstracts

**Data/Mathematics/Statistics:**

- ArXiv, E-Print Archive (Open Access)
- Collection of Biostatistics Research Archive (COBRA)
- Handbook of Statistics
- Lecture Notes in Mathematics
- MathSciNet: Mathematical Reviews on the Web
- Resources for Economists – Data
- ScienceDirect
- SIAM eBooks
- SimplyAnalytics
- Social Explorer
- SpringerLink
- Statistical Abstract of the United States

In many and likely in most cases, these databases provide full text copies of the relevant documents. For the journal articles and book chapters we own that are available only in print format, the Libraries will scan and send a digital copy via email. For those documents we do not own, the Libraries will acquire them using Interlibrary Loan.

### **Monographs**

A search of the University of Maryland Libraries' WorldCat UMD catalog was conducted, using a variety of relevant keyword and subject terms. The search shows our current collection of scholarly monographs in print and e-format related to GVPT, Data, Mathematics and Statistics is sufficient to support the new proposed program.

Many of the broad keyword/s and subjects can be further defined by adding additional keywords such as: data, united states, statistics, presidents, states...

For example, political campaigns data; public opinion presidents

Broad keyword/s and subjects include:

elections

political campaigns

politics and government

public opinion

coding theory

research design

social sciences research methodology

social sciences statistical methods

statistical models

survey methodology

surveys and questionnaires

The Libraries will continue to acquire monographs in the subject areas that support the proposed program. Titles not already part of the collection can usually be added upon request.

### **Interlibrary Loan Services**

Interlibrary Loan Services will obtain books we do not own or are checked out. In addition, Interlibrary Loan will provide digital copies of journal articles and book chapters whether we own in print or do not own.

(<https://www.lib.umd.edu/access/ill>)

### **Additional Materials and Resources**

In addition to journals, monographs and databases available through the University Libraries, students in the proposed program will have access to media, datasets, software, and technology.

Library Media Services (<http://www.lib.umd.edu/lms>) houses media in a variety of formats that can be utilized both on-site and via ELMS course media.

GIS Datasets are available through the GIS Data Repository (<http://www.lib.umd.edu/gis/dataset>).

Statistical consulting, workshops and additional research support is available through the Research Commons (<http://www.lib.umd.edu/rc>).

Technology support and services are available through the Terrapin Learning Commons

(<http://www.lib.umd.edu/tlc>).

The UM Libraries' have a professional staff of Librarians providing an important resource for help in locating information. In addition, subject specialists are available to provide instruction sessions for specific courses within the proposed program.

Government and Politics:

Judy Markowitz ([judym@umd.edu](mailto:judym@umd.edu))

Mathematics:

Nevenka Zdravkovska ([nevenka@umd.edu](mailto:nevenka@umd.edu))

### **Other Research Collections**

The Libraries are a member of the Inter-university Consortium for Political and Social Research (ICPSR) enabling access to the data deposited there. Because of the University's unique physical location near Washington D.C., Baltimore and Annapolis, University of Maryland students and faculty have access to some of the finest libraries, archives and research centers in the country vitally important for researchers. These include the Library of Congress, the National Archives and the Washington Research Library Consortium.

### **Data Sets**

When possible, the Libraries acquire data sets to support research. Access to specific data sets is often limited because of cost or limitations placed by publishers.

### **Public Opinion**

We have access to the Roper iPOLL, but not Gallup. There have been many requests from GVPT faculty and graduate students for the Gallup databases, but the cost is prohibitive.

### **Conclusion**

The Libraries' current monograph, journals and databases are adequate to support teaching and learning for the Master of Science Degree in Applied Political Analytics. For public opinion polls, the Libraries also provide access to Roper iPOLL, but not to Gallup. Subject Specialists and other Librarians as well as Interlibrary Loan, Research Commons and Research Data Services are available to support the program.

**Appendix C  
Financial Tables**

	Year 1	Year 2	Year 3	Year 4	Year 5
Undergraduate credits	240	240	240	240	240
Undergraduate tuition	0	0	0	0	0
Graduate credits	270	1020	1020	1020	1020
Credit hour rate	1074	1106	1139	1174	1209
Graduate tuition	289980	1128344	1162195	1197061	1232972
Number of GA's	4	5	6	6	6
GA stipend	23431	24134	24858	25604	26372
Total GA stipends	93724	120670	149148	153622	158231
GA tuition	17208	17724	18256	18804	19368
Total GA tuition	68832	88621	109536	112822	116207
GA fringe benefits	30929	39821	49219	50695	52216
Total GA	193485	249112	307902	317139	326653
Number of faculty	1.0	2.0	2.5	2.5	2.5
Faculty salary	100000	103000	106090	109273	112551
Total faculty salary	100000	206000	265225	273182	281377
Faculty fringe benefits	33000	67980	87524	90150	92854
Total faculty	133000	273980	352749	363332	374232
Number of administrative support	1	1	1	1	1
Administrative salary	60000	61800	63654	65564	67531
Total administrative salary	60000	61800	63654	65564	67531
Administrative fringe benefits	19800	20394	21006	21636	22285
Total administrative	79800	82194	84660	87200	89816
Equipment	5000	5000	5000	5000	5000
Library	5000	5000	5000	5000	5000
New or renovated space	0	0	0	0	0
Other expenses: operational expenses	50000	50000	50000	50000	50000
Total expenses	466285	665286	805311	827671	850701
Resources less expenditures	-176305	463059	356883	369390	382272
OES	28998	112834	116219	119706	123297
Net to GVPT\JPSM	-205303	350224	240664	249684	258974



## Response to the Graduate PCC Committee Concerning Competitive Programs

Several area programs might be considered competitors to the JPSM-GVPT initiative. Programs in Maryland and DC would be the greatest competition for our efforts to leverage our location near the US and Maryland capitals.

Within the USM system, UMBC currently offers a Data Science MPS at Baltimore and Shady Grove campuses. These are offered through UMBC's Department of Computer Science and Electrical Engineering (<https://professionalprograms.umbc.edu/data-science/>). This program is focused on technical skills of data analysis, and – unlike ours – is not built around applications of interest to politics.

In the Washington DC area, American University and Georgetown University offer programs in data science with a link to policy issues. American has a program track in Applied Public Affairs (<https://www.american.edu/programs/shared/data-science/>). This program draws the great majority of its faculty from computer science, in contrast with our program's efforts to draw from a well-established political science tradition. Georgetown's program (<https://mccourt.georgetown.edu/master-in-data-science-for-public-policy>) combines a more traditional public policy curriculum with data science applications. This is perhaps the closest to our program, but at a substantially higher cost (see below).

In addition, the costs of the American and Georgetown programs are substantially higher. Compared with our per credit rate of \$1,079, American's per credit cost is \$1759 and Georgetown's is \$2139.

Respectfully submitted,

Margaret Pearson  
Interim Chair, GVPT  
November 26, 2019