MLDS Center
Maryland Longitudinal Data System

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Memorandum

TO: MLDS Governing Board

FROM: Mr. Ross Goldstein, Executive Director

DATE: September 5, 2025

SUBJECT: Project Approvals and Updates

Purpose

This agenda item is to update the Board on projects that have been reviewed and approved by the Executive Director under *Project Approval and Management Procedures;* projects that, when necessary, require Board review and approval; and updates on ongoing projects. Please note that in addition to the information presented for each new project, this memorandum also includes the complete project abstract submitted by the researcher for your further information and review.

Projects for Consideration

ERA # 95	An Examination of Special Education Receipt for Emergent Multilingual Learners in Maryland
Researcher	Dr. Jose Ortiz University of Maryland College of Education
Research Questions	1. To what degree are multilingual learners over or underrepresented in special education in Maryland schools relative to their monolingual peers? 2. To what degree does interaction with the child welfare system predict special education service receipt for multilingual learners relative to their monolingual peers.
RPB Review	The RPB was supportive of the project.
Exec. Dir. Determination	Approved. The subject of this project is responsive to the Research Agenda, provides information about student performance that can be used to improve the state's education system, requires the use of longitudinal cross sector data, and is being conducted by a qualified researcher.
Board Action	Informational

ERA # 115	Labor Market Outcomes from Workforce Training Programs
Researcher	Mr. John Green Johns Hopkins University
Research Questions	1. How do the labor market outcomes of noncredit workforce training vary across income levels and demographic groups? 2. How can noncredit workforce training programs improve the labor market outcomes of individuals who have had interactions with the Juvenile Justice system or removals by Child Protective Services? 3. What is the causal impact of noncredit workforce training programs on the earnings and employment of workers born in 2002 or after and displaced in the COVID-19 recession?
RPB Review	The RPB was supportive of the project and was enthusiastic about the use of noncredit workforce training data.
Exec. Dir. Determination	Approved. The subject of this project is responsive to the Research Agenda, provides information about student performance that can be used to improve the state's education system, requires the use of longitudinal cross sector data, and is being conducted by a qualified researcher.
Board Action	Informational

ERA # 111	How Courses Matter: Leveraging Rich Course Data and Machine Learning to Support Women and Historically Minoritized Students in the STEM Career Pathway
Researcher	Mr. Max Anthenelli University of Maryland College of Education
Research Questions	1. What are common patterns in students' grades 6-12 (middle school through high school) course selection sequences? ● How do the revealed sequences correlate with student-, teacher-, and school-level demographics and outcomes such as grade level advancement and college major selection? 2. What, if any, are the causal effects of trajectory-based individualized treatment on women and historically minoritized students on progressing through the STEM pathway? (e.g. what is the effect of taking computer science courses in 9th grade for female students?) ● What recommendations do these effects suggest to individual LEAs or schools to best support their women and historically minoritized students in the STEM pathway?

RPB Review	The RPB has questions about the course sequencing method. Mr. Antheneli was responsive to the request for additional information and the RPB was supportive of the project.
Exec. Dir. Determination	Approved. The subject of this project is responsive to the Research Agenda, provides information about student performance that can be used to improve the state's education system, requires the use of longitudinal cross sector data, and is being conducted by a qualified researcher.

*This form is subject to disclosure in a Public Information Act request.

Project Title	Agency Control #
An Examination of Special Education Receipt for Emergent Multilingual Learners in Maryland	95

Contents

Section 1. Principal Investigator

Principal Investigator (please list additional project team members in Section 7)
José A. Ortiz
Principal Investigator's Email Address and Phone Number
Jortiz5@umd.edu 413-687-5899
Name of University or Organization
University of Maryland, College Park Department of Hearing and Speech Sciences
Principal Investigator Background and Qualification (provide overview of experience and attach a CV)
José Ortiz is an Assistant Professor in the department of Hearing and Speech Sciences at the University of Maryland College Park. His research is focused on disability identification for multilingual learners and includes both clinical research as well as an examination of issues related to

Important: Once submitted, this application is a public document that will be shared with stakeholders throughout the project review process and generally made available pursuant to a *Public Information Act Request*.

disproportionality in special education. His work has a central focus on better understanding the degree to which children from language minority communities, primarily multilingual learners, are disproportionately identified with disabilities. He is currently working on several research projects related to language assessment methods, disability risk, and potential interventions. He has worked with data from large education data sets, including the Early Childhood Longitudinal Study.

CV attached

A completed form is available here for your review.

Section 2. Project Information

Background and Purpose of the Study
(No more than 500 words; please include references; references do not count toward the word count)

Approximately 20% of the US population between the ages of 5 and 19 speaks a language other than English at home (Dietrich & Hernandez, 2019). Despite comprising an increasingly large proportion of the US student population, emergent multilingual learners, commonly referred to as English learners, are at a higher risk of experiencing academic difficulties (National Center for Education Statistics, 2021) and are disproportionately represented in special education. Emergent multilingual learners are both over- and underrepresented in special education, with different trends depending on factors such as grade level and language background.

Disproportionality in special education has been regarded primarily as a problem of overrepresentation, but recent research has highlighted a more complex issue. Several studies have shown that multilingual learners are overrepresented in special education (Artiles et al., 2005; De Valenzuela et al., 2006; Sullivan, 2011), while others have provided evidence of underrepresentation (Morgan et al., 2015, 2017). A dynamic pattern of disproportionality has been demonstrated, with the likelihood of disability identification differing as students progress through school. Samson and Lesaux (2009) found that multilingual learners were underrepresented in special education in kindergarten, but overrepresented by third grade.

Several factors are thought to contribute to the inequities facing multilingual learners, including issues associated with the special education eligibility determination process and barriers related to socioeconomic, cultural, or linguistic differences (Hibel et al., 2010; Morgan et al., 2015; Umansky et al., 2017). Multilingual learners are often from low socioeconomic backgrounds, with limited access to high quality education and healthcare in early childhood, resulting in more restricted access to support services. In addition, interactions with child welfare systems can also have a significant impact on multilingual learners' experiences in special education. Children in foster care or other forms of out-of-home care are more likely to be identified as having disabilities and receive special education services (Ringeisen et al., 2008). This intersection is particularly relevant for multilingual learners, who may already face barriers in accessing educational resources.

The state of Maryland has a significant proportion of residents who speak a language other than English at home. Given this context, understanding the experiences of multilingual learners in special education is crucial for developing effective policies and practices to support these students. This research aims to better understand the mechanisms underlying disproportionality in special education for multilingual learners in Maryland public schools. The study will address three main aims:

Aim 1: Describe trends in special education for multilingual learners in Maryland public schools compared to monolingual students, examining how special education service receipt varies by grade level and language background.

Aim 2: Investigate the impact of interactions with child welfare systems on special education service receipt among multilingual learners, considering how these systems may exacerbate or mitigate existing disparities in educational opportunities.

References

Artiles, A. J., Rueda, R., Salazar, J. J., & Higareda, I. (2005). Within-group diversity in minority disproportionate representation: English language learners in urban school districts. *Exceptional Children*, *71*(3), 283–300. https://doi.org/10.1177/001440290507100305

De Valenzuela, J. S., Copeland, S. R., Qi, C. H., & Park, M. (2006). Examining educational equity: Revisiting the disproportionate representation of minority students in special education. *Exceptional Children*, *72*(4), 425–441. https://doi.org/10.1177/001440290607200403

Dietrich, S., & Hernandez, E. (2019). Language Use in the United States: 2019. *American Community Survey Reports*.

Hibel, J., Farkas, G., & Morgan, P. L. (2010). Who is placed into special education? *Sociology of Education*, *83*(4), 312–332. https://doi.org/10.1177/0038040710383518

Morgan, P. L., Farkas, G., Hillemeier, M. M., Li, H., Pun, W. H., & Cook, M. (2017). Cross-cohort evidence of disparities in service receipt for speech or language impairments. *Exceptional Children*, *84*(1), 27–41. https://doi.org/10.1177/0014402917718341

Morgan, P. L., Farkas, G., Hillemeier, M. M., Mattison, R., Maczuga, S., Li, H., & Cook, M. (2015). Minorities are disproportionately underrepresented in special education: Longitudinal evidence across five disability conditions. *Educational Researcher*, *44*(5), 278–292. https://doi.org/10.3102/0013189X15591157

National Center for Education Statistics. (2021). *The condition of education 2021*. https://nces.ed.gov/programs/coe/

Ringeisen, H., Casanueva, C., Urato, M., & Cross, T. (2008). Special Health Care Needs Among Children in the Child Welfare System. *Pediatrics*, *122*(1), e232–e241. https://doi.org/10.1542/peds.2007-3778

Samson, J. F., & Lesaux, N. K. (2009). Language-minority learners in special education: Rates and predictors of identification for services. *Journal of Learning Disabilities*, *42*(2), 148–162. eric.

Sullivan, A. L. (2011). Disproportionality in special education identification and placement of English language learners. *Exceptional Children*, *77*(3), 317–334. https://doi.org/10.1177/001440291107700304

Umansky, I. M., Thompson, K. D., & Díaz, G. (2017). Using an ever–English learner framework to examine disproportionality in special education. *Exceptional Children*, *84*(1), 76–96. https://doi.org/10.1177/0014402917707470

Research Project Question

1. To what degree are multilingual learners over or underrepresented in special education in Maryland schools relative to their monolingual peers?
2. To what degree does interaction with the child welfare system predict special education service receipt for multilingual learners relative to their monolingual peers.

Research Methods
(Please include information for: Sample/Cohort and Justification; Definition of Measures and Constructs; Analysis Approach)

We focus on children enrolled in schools in Maryland, from years 2008 to present. We will conduct longitudinal analyses on cohorts or children enrolled in school from kindergarten to grade 8 (see the table below for all of the variables to be included). Research question 1 will be examined through

descriptive analyses of education data. Specifically, we will examine the number of children receiving special education services who are classified as English learners, relative to those not classified as English learners. We will calculate the proportion of children in each group receiving services for each grade, for each cohort represented in the data. This will provide insight into the degree to which multilingual learners are disproportionately represented in special education as they progress through school, relative to their monolingual peers. This approach has been used in previous studies of disproportionality (Artiles et al., 2005; Umansky et al., 2017).

Research question 2 will examine how interactions with the child welfare system in Maryland relate to receipt of special education services and academic outcomes for multilingual learners and their monolingual peers. Specifically, we will investigate the impact of the number of out-of-home placements and the length of these placements on the likelihood of being identified for special education services and academic performance. To examine special education service receipt, we will use multi-level discrete time hazard models. These models provide information about the likelihood of being identified with a disability, for children who have not previously been identified, and have been used in previous studies on disproportionality using large data sets, such as the Early Childhood Longitudinal Study (Hibel & Jasper, 2012; Morgan et al., 2015) as well as administrative data sets (Cruz & Firestone, 2022; Umansky et al., 2017).

To examine academic outcomes, we will use multilevel models with academic achievement variables (assessment component results) as the outcome. Multilevel models are useful for late arriving participants, as they can be used in the presence of differing waves of data across participants while also accounting for the hierarchical structure of the data. This is particularly useful for multilingual children, many of whom may be from immigrant families who entered school after kindergarten. To isolate the effect of interactions with child welfare programs, all models will include a range of controls, including variables related to demographics and socioeconomic status. This analysis will provide valuable information about the mechanisms underlying the likelihood of special education service receipt for children from different language backgrounds in Maryland. In addition, we will gain insight into the specific challenges faced by multilingual learners in the child welfare system, which can be used to inform policies aimed at supporting these vulnerable populations.

For students who transfer into schools from outside of Maryland, their classification as English learners may differ due to the various methods schools use to assess English proficiency. Students who previously received English as a second language services may not necessarily continue to receive them after reassessment in Maryland schools. Our primary focus is on the educational classification of English learners in Maryland, and without information on prior English learner designations, we will rely solely on the classification provided by the MSDE. Similarly, students who did not previously receive special education services may be identified as needing them upon arrival in Maryland. In these cases, since we lack data for the years prior to their entry into a Maryland school, we will only include data for the years in which it is available. To ensure the robustness of our findings in the presence of transfer students, we will conduct robustness checks by comparing models that include data for transfer students and those that exclude it.

Requested data:

Variable Name	Description	CEDS ID	Sector	Source
Person ID	Child welfare identifier	001071	Child Welfare	DHS
Placement count	Number of placements in out of home services care	N/A	Child Welfare	Child Welfare Data

County of Residence	County of residence	000190	Child Welfare	DHS
Placement Start Date	The date that best describes the start of out of home service placement.	N/A	Child Welfare	Child Welfare Data
Placement End Date	The date that best describes the end of out of home service placement.	N/A	Child Welfare	Child Welfare Data
NCES_LEA_SCHOOL_ID	NCES 12 digit LEA/School Identifier	N/A	K-12 Education	MSDE
15-Digit Geographic ID	Data from the US Census Geocoder service. The geographic boundaries that make up the census tracts are redrawn as part of the decennial census. Values are retrieved from the US Census Bureau Geocoder service.	001179	K-12 Education	US Census
Student birth year	The four digit year	000033	K-12 Education	MSDE
Student Race	Race-ethnicity of student as one or more of: Hispanic-Latino, Asian, Black/African-American, Native Hawaiian or Other Pacific Islander, White/Caucasian, American Indian/Alaskan Native	000144 000020 000034 000192 000301 000016	K-12 Education	MSDE
EL Status (English Language Learner Indicator)	A student who has a primary or home language other than English and who has been assessed as having limited or no ability to understand, speak, or read English.	000180	K-12 Education	MSDE
English Learner Service Begin Date	Eight-digit date (YYYYMMDD) a student classified as an English learner began receiving ESOL services in any school in the U.S. EL	001247	K-12 Education	MSDE
Special Education (SE) Indicator	Indicator of special education status.	000151	K-12 Education	MSDE
Assessment component score	Student performance from the following assessments: SAT, ACT, PSAT, HSA, MSA, ALTMSA, AP, IB, PARCC, "Remedial Evaluation".	N/A	K-12 Education	MSDE
Free/Reduced Price Meals Eligibility	A student's eligibility to receive Free or Reduced Price Meals under the National School Lunch Program.	000092	K-12 Education	MSDE

How will this research benefit the State of Maryland in terms of state or local policy and/or practice?

1. **Education outcomes for all children.** Results from this research will provide insight into differences in special education service receipt for multilingual learners and monolingual children across schools in Maryland. Results from this research will support the development of policies that will improve equitable access to special education services, and methods of improving academic outcomes for all learners. For example, a clearer understanding of disproportionality patterns will allow schools to more precisely align screening at school entry with the needs of their local populations.

2. **Interactions with child welfare and education outcomes.** By examining how interactions with child welfare programs relate to special education service receipt and academic outcomes for multilingual children, this research will provide critical insights into the unique challenges faced by this population. A better understanding of this relationship will support the development of targeted policies and interventions that can better support multilingual learners within the child welfare system. This will ultimately lead to improvements in the long-term outcomes for all children, by ensuring that they receive the necessary resources to succeed.

Explain why this research requires longitudinal cross-sector data?

This research focuses on education outcomes across grades for children in Maryland. Because we will focus on individual-level outcomes for children as they progress through school, longitudinal data is necessary to appropriately examine how special education service receipt may change over time. Because multilingual children may be more likely to receive special education services in earlier grades than others, longitudinal data is needed to better understand differences in trends for children from different groups. These data will also be able to provide information about outcomes for children from different cohorts, for the years included in the data set. The examination of multiple cohorts can provide insight into how outcomes have changed over time, with implications about policies and practices that may be associated with these changes. Cross-sector data are required because many of the variables that are relevant to this research come from several sources. In order to examine the relationship between interactions with child welfare programs and education outcomes, data from both K-12 Education and Child Welfare is required.

Proposed Center Output
(Typical products for the MLDS Center include a research series presentation to stakeholders and a research brief in the MLDS Center template).

MLDS Center research brief
Presentation at the MLDS Center research series

Timeline for the proposed project (identify major deliverables and approximate dates)

Task	Year 1	Year 2	Year 3
Clean data as needed	X		
Examine descriptive statistics	X		
Construct/test scripts for statistical analyses	X		
Conduct final analysis of data		X	
Write manuscript		X	X
Revise paper for journal submission			X

Plans for further development (i.e. journal submission, etc)

Data products relating to this research will be submitted for publication/presentation in several relevant outlets, such as:

Exceptional Children
Journal of Learning Disabilities
Learning Disability Quarterly
Remedial and Special Education

Council for Learning Disability Convention
American Speech-Language-Hearing Association Convention
Pacific Coast Research Conference

Section 3. MLDS Center Research Agenda

Does your project relate to one of the following areas which the General Assembly has specifically directed the MLDSC to study:	Yes	No
The impact of a State or federal education program?[1]	X	
The performance of educator preparation programs?		X
Best practices regarding classroom instruction?		X
The impact of child welfare programs on the educational and economic outcomes of students?	X	
An analysis of social determinants, provided by State agencies[2] and appropriate local agencies, that impact education performance of students and indicate the need for wraparound services for students.	X	
Does your project use State or Federal financial aid[3] data?		X

If you are requesting to use FAFSA data please explain how this research will benefit the administration of Title IV federal financial aid.

N/A

[1] All projects must relate to a state or federal education program. If you are not sure, please contact ross.goldstein@maryland.gov.

[2] State agencies include: Maryland Department of Health, Department of Human Services, and Department of Juvenile Services

[3] Financial aid data derived from the FAFSA may only be used in research to improve the administration of federal financial aid programs.

Research Agenda Category (page 2 of the Research Agenda) – Which category does the project address? Please explain.
This research addresses the Educational, Service & Workforce Outcomes category. Information about trends and predictors of special education eligibility will provide critical insight into the short- and long-term outcomes for both multilingual and monolingual children. This research will also provide insight into the role that interaction with child welfare plays in long-term education outcomes. This is important information when making decisions about addressing potential challenges that schools face.
Research Agenda Themes (page 2-3 of the Research Agenda) - Which cross cutting theme is incorporated in the project? Please explain.
This study most closely aligns with the Social Determinants theme. The overarching goal of this study is to examine how children from different language backgrounds are able to access special education services. To accomplish this goal, this research will examine a range of different variables that may also be associated with special education service receipt. This includes an examination of relevant individual-level predictors to estimate their association with education outcomes, including demographic, socioeconomic, and education variables.

Section 4. Data and Cross Sector Analysis

Please review the MLDS Center Data Inventory and the MLDS Center Data Gap Analysis prior to completing this section.

Sectors* ***The data falling within each sector is outlined below. The purpose of this section is to ensure the project is cross sector. Projects will not necessarily use all data elements within the sector (see methods section for definitions of measures).**	**X**
Early Childhood Education Sector	
K-12 Education Sector	X
Adult Education Sector	
Justice Involved Youth Sector	
Child Welfare Sector	X
Postsecondary Education Sector	
Other Completions and Credentials Sector	
Workforce Sector	

Put an 'x' next to each data sector your project will include. You must have at least 2 sectors.

Do you plan to request to include external data as part of your project?
No

***Sectors**

Early Childhood Education Sector
- PreK Academic Engagement

K-12 Public School Education Sector
- Enrollment and attendance
- Assessments
- Courses and grades
- Completions
- Discipline
- Public School Characteristics

Adult Education Sector
- GED/NEDP Exam Results
- Apprenticeship
- Adult Education
- Correction Education

Juvenile Justice Sector
- Juvenile Justice Records
- Juvenile Education Records

Child Welfare Sector
- Out-of-Home Placements

Postsecondary Education Sector
- College and University Enrollment
- College and University Courses, Credits and Grades
- College and University Degrees
- College and University Workforce Training
- Financial Aid

Other Completions and Credentials Sector
- Industry Certifications
- Licenses

Workforce Sector
- Public School Teachers
- Public School Staff
- Workforce visibility/participation
- Workforce Earnings
- Workforce Industry

Section 5. Financial Information

The MLDS Center incurs costs for every project related to: (a) IT support and infrastructure; (b) assistance from subject matter experts, (c) criminal history background checks; and (d) creation of an analytic data set. Average project costs are between $1,000 and $3,000. A detailed, customized estimate will be provided prior to project initiation. (Please indicate your answer with an "X)

X	I will reimburse MLDSC for all applicable fees.
	I will only be able to provide partial reimbursement.
	I will need a waiver.

Grant Funding (indicate with an 'X')

	This project has already received funding
	I plan to apply or am in the process of applying for grant funding
X	No grant funding is planned

Name of Grantor

N/A

RFP or Grant Program Information (you may provide a link to the grantor's website)

N/A

Amount of grant funds sought or awarded.

N/A

Grant Application Date

N/A

Do you intend to proceed without grant funding?

Yes, though additional funding may be pursued in the future.

Are you receiving other funding for this proposed project? If yes, how much?

Funding is provided by the University of Maryland, College Park as part of a faculty startup package.

Section 6. Special Considerations

Principal Investigators NOT affiliated with a Maryland College or University – please provide information on: **a. Your familiarity with Maryland policies affecting your research topic; and** **b. How your project meets a specific Maryland research need?** **Please also upload (with this form) any letters of reference or endorsement from a Maryland researcher or a State or local agency that vouches for your qualifications and expertise.**
N/A
For projects that involve a small population, please confirm that you are aware of the MLDS Center's data suppression policy and explain how you will report your findings while conforming to the suppression requirements.
This study will focus on children across Maryland. I am aware of the MLDS Center's Data Suppression Policy. Given the size of the population intended for this study, it is unlikely to have a small sample size. If certain data are suppressed, aggregate data will be reported as appropriate.
For projects that involve a single school system, university, or program, please explain the statewide implications of the project. **Please also upload (with this form) any letters of support from the subject (i.e. school system or university) of the study.**
N/A

Section 7. Project Team

Project Team

- **Please list all members of the research team and indicate roles and responsibilities.**
- **If the Principal Investigator listed in Section 1 above is NOT the primary point of contact for the project (including research, data access, and presentations to stakeholders), please indicate which team member is the primary point of contact and provide that individual's contact information.**

Name and Organization	Role	Is system access needed? (Yes/No)
José A. Ortiz, UMD College Park	PI	Y
Jason C. Chow, Vanderbilt University	Co-PI	N
Jessica Nolasco, UMD College Park	Research assistant	N

Section 8. Submission

Once this form is completed, please complete the online application (here) and upload this form, CVs for all members of the research team, and any other supporting materials.

*This form is subject to disclosure in a Public Information Act request.

Project Title	Agency Control #
Labor Market Outcomes from Workforce Training Programs	115

Contents

Section 1. Principal Investigator

Principal Investigator (please list additional project team members in Section 7)
John Green
Principal Investigator's Email Address
jgree199@jh.edu
Name of University or Organization
Johns Hopkins University, Department of Economics
Principal Investigator Background and Qualification (provide overview of experience and attach a CV)
I am a 4th year economics PhD student at Johns Hopkins University (expected graduation in May 2027). Prior to starting graduate school, I worked in the economic research department in the Massachusetts' Executive Office of Labor and Workforce Development, where I was primarily responsible for research and analysis about the Massachusetts labor market and the Unemployment

Important: Once submitted, this application is a public document that will be shared with stakeholders throughout the project review process and generally made available pursuant to a *Public Information Act Request*.

Insurance program. As part of my responsibilities, I worked with large scale state administrative data on UI claims. As a PhD student, I have worked on projects using the NLSY79, NLSY97, and CPS data sets, as well as administrative data from the IRS. My interests are in labor economics generally, with a focus on government programs and education.

Section 2. Project Information

Background and Purpose of the Study
(No more than 500 words; please include references; references do not count toward the word count)

While much research has examined workforce training programs, significant gaps remain in our understanding of whom these programs help, how they do so, and their optimal design. My research will contribute to this literature with a study of noncredit workforce training (NWT) programs in Maryland. I will first analyze variation in outcomes by demographic group and K-12 experience, then measure the effect of program completion on displaced workers' outcomes.

Barnow and Smith (2015) review the literature on employment and training programs, various federally funded programs. Their findings are mixed: some programs are found to improve earnings and employment, others show gains in only one area, and some have little effect. In 2017, Mathematica released results from the *WIA Adult and Dislocated Worker Programs Gold Standard Evaluation*, a randomized controlled trial examining employment programs for adults and dislocated workers. They found no significant effects from WIA-funded training programs, though this may be due to low statistical power. Notably, fewer than half of study participants who enrolled in occupation-specific training found employment in that occupation.

Katz et al. (2020) is a helpful touchpoint, focusing on sector-specific training similar to NWT programs. Their findings suggest generally positive effects on employment and earnings, with variation by sector and the inclusion of "wraparound" employment services. Because the Noncredit Workforce Completers System (NWCS) contains information on training across a wide range of fields, Maryland's NWT programs offer a unique opportunity for richer analysis than previous studies, including Katz et al.

This project has two main goals. First, I will examine heterogeneity in NWT program outcomes by race, family income (as proxied by free or reduced-price lunch status), prior experience of out-of-home placements by Child Protective Services, and interactions with the juvenile justice system.

The second goal is to estimate the causal effect of completing a NWT program on the earnings and employment of displaced workers during the COVID-19 recession. I do not restrict this to those receiving WIOA funding, since many displaced workers do not go through the American Jobs Centers. Instead, I will infer displacement using the methodology of Couch and Placzec (2010), who identify job separations using changes in employer account numbers. Although imperfect, this methodology is proven and feasible within MLDS. If the project is ongoing when UI claims are incorporated into the MLDS we will amend our application to request access to these variables, which will validate our first methodology and provide for a richer analysis.

The peculiarities of the COVID-19 pandemic also present an interesting source of exogeneous variation in access to NWT programs. Specifically, community colleges' differing schedules for in-person programs in 2020 and 2021 can serve as an *instrument*, creating "as-if-random" assignment to training which varies based on geographic location. This allows me to compare displaced workers who participated in training with those who did not, using COVID-related closures as an instrument for treatment receipt. I will then assess the short- and medium-term differences in earnings and employment.

Works cited

Barnow, Burt, and Jeffrey Smith. 2015. "Employment and Training Programs." w21659. Cambridge, MA: National Bureau of Economic Research. https://doi.org/10.3386/w21659.

Couch, K., and Dana W. Placzek. 2010. "Earnings Losses of Displaced Workers Revisited." *The American Economic Review* 100 (1): 572–89.

Katz, Lawrence, Jonathan Roth, Richard Hendra, and Kelsey Schaberg. 2020. "Why Do Sectoral Employment Programs Work? Lessons from WorkAdvance." w28248. Cambridge, MA: National Bureau of Economic Research. https://doi.org/10.3386/w28248.

Schochet, Peter, and Linda Rosenberg. n.d. "Providing Public Workforce Services to Job Seekers: 30-Month Impact Findings on the WIA Adult and Dislocated Worker Programs." Mathematica. Accessed November 19, 2024. https://www.mathematica.org/publications/providing-public-workforce-services-to-job-seekers-30-month-impact-findings-on-the-wia-adult.

Research Project Question

1. How do the labor market outcomes of noncredit workforce training vary across income levels and demographic groups?
2. How can noncredit workforce training programs improve the labor market outcomes of individuals who have had interactions with the Juvenile Justice system or removals by Child Protective Services?
3. What is the causal impact of noncredit workforce training programs on the earnings and employment of workers born in 2002 or after and displaced in the COVID-19 recession?

Research Methods
(Please include information for: Sample/Cohort and Justification; Definition of Measures and Constructs; Analysis Approach)

I will use comparative statistics and multivariate regressions to analyze how labor market outcomes vary across race and family income (proxied by free/reduced-price lunch status) for those who complete an NWT program and those who do not (question #1). To ensure valid comparisons, I will use data for all available Maryland workers (which may be a subset of the full labor force), but in most of the analysis will restrict my sample to those born in 2002. This limits me to those who were 18 in 2020 when the NWCS data collection began and ensures that I have K-12 data for a large portion of my sample.

I will also look at how outcomes differ for those with interactions with the juvenile justice and child welfare systems by comparing mean outcomes and examining the (correlational) results from multivariate regressions (question #2). To estimate the causal impact of NWT for displaced workers (question #3), I will employ an instrumental variables approach leveraging differences in access to NWT programs during COVID in a two-stage least squares framework with a full set of control variables to measure the impact of NWT on earnings and labor supply.

I will primarily focus on the level and growth of quarterly earnings as the main variable of interest in these analyses. In addition, I will consider the receipt of unemployment insurance, which, during the study period, serves as a highly effective proxy.

For all analyses, I will incorporate a rich set of historical control variables (mainly but not exclusively drawn from the K-12 data) to isolate the impacts of training separately from demographic characteristics and other experiences that may covary with income and program participation.

How will this research benefit the State of Maryland in terms of state or local policy and/or practice?

This research project offers several potential benefits for the state of Maryland NWT programs enroll tens of thousands of students: in the 2022–2023 school year alone, more than 22,000 noncredit awards were issued. Since this figure includes only successful completions, the total number of participants is even higher. Although I do not have an estimate of the total costs of these programs, even at a modest per-student cost they represent several millions of dollars in tuition and state and federal funding. Understanding the benefit of these programs, and for whom the payoff is greatest, has important implications for directing state resources effectively.

If state funding for NWT programs represents a direct budgetary cost, then the increase in tax revenues these programs may generate by improving labor market outcomes is a second (and potentially larger) channel through which NWT programs affect the state's budget. Higher earnings among workers lead to greater tax contributions, and a better prepared workforce will drive Maryland's economy by attracting businesses, fostering entrepreneurship, and increasing productivity in existing firms. My research will offer direct evidence on the increased earnings and tax revenue these programs may generate, by estimating their causal impact on displaced workers' earnings.

Finally, my project will shed light on how these programs may improve labor market outcomes for traditionally marginalized groups such as low-income workers and underrepresented minorities. To the extent that the state is interested in encouraging economic mobility and creating a fair economy that works for all, including those without college degrees, my project will provide suggestive evidence on how NWT programs can act as a tool to achieve this goal.

Explain why this research requires longitudinal cross-sector data?

The research questions explored here are fundamentally longitudinal. Since I seek to understand how NWT programs are associated with different labor market outcomes later in life, the before-and-after nature is critical. In addition, isolating the impact of NWT from other variables (such as family income) requires the rich set of controls that the MLDS provides; for example, I would like to proxy for income during childhood using information on free and reduced-price lunch status from the K-12 data.

Proposed Center Output
(Typical products for the MLDS Center include a research series presentation to stakeholders and a research brief in the MLDS Center template).

Since this project's focus cuts across disciplines, I will compile a report of my findings for both MHEC and the Department of Labor. The former will focus on the broader impacts of NWT programs and

their heterogeneous effects, while the latter will focus on my findings about the impact of NWT on the outcomes of displaced workers. I will make myself available for a presentation to either department, should there be interest from the stakeholders.

Timeline for the proposed project (identify major deliverables and approximate dates)

My timeline assumes about one year for the bulk of work on this project. Assuming that I am granted access to the data in the spring of 2025, my approximate timeline is:

Spring 2025: data analysis
Summer 2025: finish data analysis and draft paper and report
Fall 2025: submit paper for presentation internally at MLDS and at external conferences
Winter 2025-2026: Incorporate feedback from advisors and presentation audiences and finalize paper
Spring 2026: Deliver a final report to MHEC and present findings at MHEC headquarters. Submit paper for consideration at economics journals.

Plans for further development (i.e. journal submission, etc)

This project will likely be submitted as a second or third chapter in my PhD dissertation at Johns Hopkins University. In addition, I will submit it for publication in an academic journal such as the Journal of Labor Economics. I will also present the findings at internal seminars and at academic conferences such as the Southern Economic Association.

Section 3. MLDS Center Research Agenda

Does your project relate to one of the following areas which the General Assembly has specifically directed the MLDSC to study:	**Yes**	**No**
The impact of a State or federal education program?[1]	X	
The performance of educator preparation programs?		X
Best practices regarding classroom instruction?		X
The impact of child welfare programs on the educational and economic outcomes of students?		X
An analysis of social determinants, provided by State agencies[2] and appropriate local agencies, that impact education performance of students and indicate the need for wraparound services for students.	X	
Does your project use State or Federal financial aid[3] data?		X

If you are requesting to use FAFSA data please explain how this research will benefit the administration of Title IV federal financial aid.

N/A

[1] All projects must relate to a state or federal education program. If you are not sure, please contact ross.goldstein@maryland.gov.
[2] State agencies include: Maryland Department of Health, Department of Human Services, and Department of Juvenile Services
[3] Financial aid data derived from the FAFSA may only be used in research to improve the administration of federal financial aid programs.

Research Agenda Category (page 2 of the Research Agenda) – Which category does the project address? Please explain.

Research questions #1 and #2 primarily fit into the MLDS' focus on **Educational, Service & Workforce Outcomes**. I will look at how NWT programs are associated with different labor market outcomes for participants from different racial groups, ethnicities, and levels of family income. I will also explore how different groups select into participation at different rates. The MLDS offers an especially unique opportunity to look at how NWT programs may improve the labor market outcomes for individuals who have experienced removal by Child Protective services or have had interactions with the juvenile justice system.

Research question #3 addresses the goals of **Educational, Service & Workforce Outcomes** as well, but because I am finding a causal effect of the program, it also fits in well with the goal of **Program & Policy Evaluations**. With a specific focus on displaced workers, I will examine the ameliorating effect of NWT programs on earnings and employment, and as a result will be able to help evaluate the cost-effectiveness of the program and identify which groups it seems to help the most.

Research Agenda Themes (page 2-3 of the Research Agenda) - Which cross cutting theme is incorporated in the project? Please explain.

While this research relates to all three cross-cutting themes guiding the MLDSC mission, it is most directly relevant to *Supports and Barriers*. Workforce training programs are particularly valuable for workers without higher education, helping them acquire skills that lead to stable, well-paying jobs. Beyond skill development, these programs also provide credentials that can help workers without prior experience or a college degree break into new careers that might otherwise be inaccessible.

My research will specifically examine how NWT programs facilitate career transitions and movement from unemployment to employment. Additionally, given the project's focus on variation in outcomes by race, ethnicity, and income status, it also has a meaningful connection to the MLDSC theme of *Social Determinants*.

Section 4. Data and Cross Sector Analysis

Please review the MLDS Center Data Inventory and the MLDS Center Data Gap Analysis prior to completing this section.

Sectors* ***The data falling within each sector is outlined below. The purpose of this section is to ensure the project is cross sector. Projects will not necessarily use all data elements within the sector (see methods section for definitions of measures).**	**X**
Early Childhood Education Sector	
K-12 Education Sector	X
Adult Education Sector	X
Justice Involved Youth Sector	X
Child Welfare Sector	X
Postsecondary Education Sector	X
Other Completions and Credentials Sector	X
Workforce Sector	X

Put an 'x' next to each data sector your project will include. You must have at least 2 sectors.

Do you plan to request to include external data as part of your project?
No.

***Sectors**

Early Childhood Education Sector
- PreK Academic Engagement

K-12 Public School Education Sector
- Enrollment and attendance
- Assessments
- Courses and grades
- Completions
- Discipline
- Public School Characteristics

Adult Education Sector
- GED/NEDP Exam Results
- Apprenticeship
- Adult Education
- Correction Education

Juvenile Justice Sector
- Juvenile Justice Records
- Juvenile Education Records

Child Welfare Sector
- Out-of-Home Placements

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- College and University Enrollment
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- College and University Degrees
- College and University Workforce Training
- Financial Aid

Other Completions and Credentials Sector
- Industry Certifications
- Licenses

Workforce Sector
- Public School Teachers
- Public School Staff
- Workforce visibility/participation
- Workforce Earnings
- Workforce Industry

Section 5. Financial Information

The MLDS Center incurs costs for every project related to: (a) IT support and infrastructure; (b) assistance from subject matter experts, (c) criminal history background checks; and (d) creation of an analytic data set. Average project costs are between $1,000 and $3,000. A detailed, customized estimate will be provided prior to project initiation. (Please indicate your answer with an "X)

	I will reimburse MLDSC for all applicable fees.
	I will only be able to provide partial reimbursement.
X	I will need a waiver.

Grant Funding (indicate with an 'X')

	This project has already received funding
	I plan to apply or am in the process of applying for grant funding
X	No grant funding is planned

Name of Grantor

RFP or Grant Program Information (you may provide a link to the grantor's website)

Amount of grant funds sought or awarded.

Grant Application Date

Do you intend to proceed without grant funding?

Are you receiving other funding for this proposed project? If yes, how much?

Section 6. Special Considerations

Principal Investigators NOT affiliated with a Maryland College or University – please provide information on: **a. Your familiarity with Maryland policies affecting your research topic; and** **b. How your project meets a specific Maryland research need?** **Please also upload (with this form) any letters of reference or endorsement from a Maryland researcher or a State or local agency that vouches for your qualifications and expertise.**
N/A
For projects that involve a small population, please confirm that you are aware of the MLDS Center's data suppression policy and explain how you will report your findings while conforming to the suppression requirements.
N/A
For projects that involve a single school system, university, or program, please explain the statewide implications of the project. **Please also upload (with this form) any letters of support from the subject (i.e. school system or university) of the study.**
N/A

Section 7. Project Team

Project Team

- **Please list all members of the research team and indicate roles and responsibilities.**
- **If the Principal Investigator listed in Section 1 above is NOT the primary point of contact for the project (including research, data access, and presentations to stakeholders), please indicate which team member is the primary point of contact and provide that individual's contact information.**

Name and Organization	Role	Is system access needed? (Yes/No)
John Green (Johns Hopkins Economics department)	Primary investigator	Yes
Wonsik Ko (Johns Hopkins Economics department)	Coauthor	No
Dr. Matthew Wiswall (Johns Hopkins economics department)	Adviser	No
Dr. Robert Moffitt (Johns Hopkins economics department)	Adviser	No
Sam Wang (Johns Hopkins)	Coauthor	No

Section 8. Submission

Once this form is completed, please complete the online application (here) and upload this form, CVs for all members of the research team, and any other supporting materials.

*This form is subject to disclosure in a Public Information Act request.

Project Title	Agency Control #
How Courses Matter: Leveraging Rich Course Data and Machine Learning to Support Women and Historically Minoritized Students in the STEM Career Pathway	111

Contents

Section 1. Principal Investigator

Principal Investigator (please list additional project team members in Section 7)
Max Anthenelli
Principal Investigator's Email Address
anthenem@umd.edu
Name of University or Organization
University of Maryland, College Park
Principal Investigator Background and Qualification (provide overview of experience and attach a CV)
Max Anthenelli is a third year Ph.D. student in education policy at the University of Maryland College Park. He earned his M.Ed. in International Education Policy from Vanderbilt University in 2022. He has been working with longitudinal data systems for 4 years. He became an affiliate with the MLDS Center in 2022.

Section 2. Project Information

Background and Purpose of the Study **(No more than 500 words; please include references; references do not count toward the word count)**

Important: Once submitted, this application is a public document that will be shared with stakeholders throughout the project review process and generally made available pursuant to a *Public Information Act Request*.

The Blueprint for Maryland's Future emphasizes equity and inclusion–aiming to ensure equal opportunities for all students–especially those historically under-served (Maryland Education Code § 5-404). Stakeholders in and out of the classroom are concerned about the lack of women and historically minoritized students in STEM careers. Researchers are increasingly using critical theories to explore how power dynamics, identity, and systemic inequalities shape women and historically minoritized students' experiences in STEM. Among these theories, quantitative critical race theory (QuantCrit) methodology provides valuable tools for identifying and addressing structural barriers across STEM education (Young et al. 2025). QuantCrit integrates critical viewpoints into statistical methods to ensure that data-informed decisions align with equity-focused goals (Castillo & Gillborn, 2022).

Some researchers have used state-level administrative data to link high school course-taking to college completion, focusing on low-complexity predictors, such as GPA or survey responses of considered majors, to understand the disparity in STEM careers (Darolia et al., 2020). We intend to expand prior research by using the rich sequence of course data and outcomes available in the MLDS to deepen the understanding of the systemic barriers affecting women and historically minoritized students in STEM career pathways.

This project builds off the work of MLDSC projects led by Dr. Jing Liu and Dr. David Blazar examining computer science course taking and college completion as well as modeling the teacher recruitment pathway to diversify the teacher workforce (Liu et al., 2024; Blazar et al., 2024). Our project will expand this work in 2 ways: (i) Implement an explicitly QuantCrit research approach centering justice and equity in research design and dissemination (Castillo & Strunk, 2024). (ii) Develop novel methods by synthesizing machine learning with causal inference methods. Both ways are outlined in greater detail in the research methods.

Case Study One:
Exploratory course trajectory analysis—we plan to look at student course taking patterns in grades 6-12 (middle school through high school) and identify common trajectories. Once early trajectories are defined, we want to develop a better understanding of the descriptive characteristics of students and schools associated with different trajectories (Han et al. 2023).

Case Study Two:
Causal inference through Markovian course sequence model—by constructing a model that predicts how taking each course influences the likelihood of taking other courses *and key outcomes*, we plan to identify causal effects of key courses in order to recommend policy reforms aimed to support women and historically minoritized students.

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Young, J., Young, J., & Edosomwan, K. (2025). The intersection of race, data, and learning: Applying QuantCrit to mathematics education research. *Journal of Urban Mathematics Education, 17*(2), 1-10.

Research Project Question

1. What are common patterns in students' grades 6-12 (middle school through high school) course selection sequences?
    - How do the revealed sequences correlate with student-, teacher-, and school-level demographics and outcomes such as grade level advancement and college major selection?
2. What, if any, are the causal effects of trajectory-based individualized treatment on women and historically minoritized students on progressing through the STEM pathway? (e.g. what is the effect of taking computer science courses in 9th grade for female students?)
    - What recommendations do these effects suggest to individual LEAs or schools to best support their women and historically minoritized students in the STEM pathway?

Research Methods
(Please include information for: Sample/Cohort and Justification; Definition of Measures and Constructs; Analysis Approach)

The overall sample includes all students attending public grade school or university in Maryland from Fall 2012 to Spring 2023 for at least 2 years ($N \approx 1,000,000$). A subset of these students are followed from their secondary to their post-secondary studies. We plan to look at two cohorts starting sixth grade in Fall 2012 ($N \approx 90,000 - 120,000$) and comparing the analysis following the same group of students over time to the overall sample results which have more power, but with shorter time-frames (6-8th grade, 8th to 9th, 9-12th grade). Central to the methodology is the use of School Courses for the Exchange of Data (SCED) codes, which we will combine with college course codes to accurately match courses with similar curricula across institutions (What is SCED?, 2024).

Key Terms:
STEM course pathway- Broadly, the STEM pathway is the concept of the pluralistic ways the education system prepares students to participate in the STEM workforce. However, we focus on how course-taking in particular from middle school to high school influences a student's likelihood of majoring in STEM.
STEM courses- those with a SCED subject area code of mathematics (02), life and physical sciences (03), computer and information sciences (10), health care sciences (14), and engineering and technology (21).
Course trajectory- the time-dependent, subject-area-specific sequence of courses. We use terms like course clusters and course sequences somewhat interchangeably. There are many common terms in the literature including course sequence typologies.**Post CCR Pathways**- College and career readiness standards from the Blueprint for Maryland's Future mention various pathways including "the IB Diploma, AP program, Dual enrollment or early college program, and Career and Technical Education (CTE) programs". (CCR standard)
Markovian course sequences- only looking at the immediate next action (opposed to longer-run) a student chose after taking the course
Trajectory Based Individualized Treatment- The Average Treatment Effect (i.e. mean change in the transition probability if you take one class or another) as estimated by our network analysis of the transition probability matrices of Markovian course sequences. The effect can be estimated for women and historically marginalized students separately.

To determine meaningful course selection sequence clusters in RQ1, we will perform a separate analysis on each combination of school-level (i.e. middle/high school) and subject (ELA, math, social studies, science, computer science, and language). Our clustering will be hierarchical with parent clusters following the tripartite categories (core, enriched, support) proposed by much of the early course tracking literature (McFarland, 2006). Child clusters will be decided both by qualitatively analyzing the individual course sequences within each parent cluster and comparing the results of the qualitative clustering to results from unsupervised learning approaches. The sample space for the clustering will break down courses into 3-5 mutually exclusive sub-disciplines for each subject (e.g. Foundational: Basic Numeracy, Elementary Math, Core Sequence: Pre-Algebra -> Algebra II, Calculus series, Higher math: Lin. Alg, ODE, Real Analysis, Applied/CTE Math: Statistics, Quantitative Reasoning, Finance Math). For each of these specialties, we will look at the number of semesters enrolled for each student, the rigor level, and possibly their current GPA in those courses. Once the course sequence clusters for each school level and subject are determined, we will compare the demographics and future outcomes associated with each of the clusters as mentioned in RQ1. Future outcomes include time to college enrollment, college major via CIP code, first term credit load, first year credits attempted and earned, and general retention.

Policies that will be examined include the state's College and Career Ready standard; LEA course requirements and availability including career and technical education, dual-enrollment, and advanced placement or international baccalaureate; and post-secondary admission policies. We will also examine how the current CCR standard relates to different post CCR pathways. Additionally, we will distinguish student course choice from LEA policy/course availability at the school. Comparing the college outcomes of students with different Post CCR pathway availabilities, but similar backgrounds otherwise should identify policies dictating course offerings and graduation requirements that are helping or hindering women and historically minoritized students reach STEM careers.

To estimate the causal effects of course-taking, we will develop a novel causal analysis framework for observational data called Trajectory-Based Average Treatment Effect (ATE). In traditional causal inference, ATEs are estimated for a single binary or continuous treatment, which may be time-varying. In our setting, the treatment is the individual's course sequence, which can be viewed as a trajectory. This is a unique example of Markovian data that is observed (as opposed to hidden) and will require the development of new methods. We will begin by creating the transition probability matrix from one course to another, as well as binary outcomes. Using techniques from network analysis, we will decompose the transition matrix to study its properties including flow, the number of communities, and the presence of bottlenecks. Afterwards, we will fit a joint model to the data, i.e. model the probability of taking a course given a student's previous courses and their demographics. Hence, by changing the weight of a demographic covariate, we can simulate from the new "counterfactual" model, allowing us to define contrasts and ultimately estimate the causal effect of interest (grade level advancement, major selection, etc.).

We understand racism is a structural and endemic factor in STEM education and acknowledge student outcomes are shaped by structural forces rather than individual deficiencies. Moreover, we rely on Gillborn, Warmington, and Demack (2018) critical perspectives for understanding that data and statistical analyses are not neutral but embedded in broader sociopolitical contexts; thus, we will follow the core tenets of QuantCrit throughout our cleaning, analysis, and dissemination of data. Approaching data cleaning with this framing means that we will preserve the richness of data in MLDS particularly for demographic categories such as race, ethnicity, and gender. Our QuantCrit data analysis will include separate targeted case studies for specific subsamples of exclusively female,

Black, and Latine students. We understand that these categories are socially constructed and can perpetuate stereotypes and misconceptions if not analyzed carefully (Wong-Campbell & Ramrakhiani, 2024), and data cannot speak for itself, as the voices and lived experiences of the students should be central to our research (Young et al., 2025).

As we will detail further in the section immediately below, this QuantCrit research process does not end upon publication. We will take an active role in the dissemination of our findings working with both other researchers to discuss methodological approaches and local communities interpreting and benefiting from the results.

How will this research benefit the State of Maryland in terms of state or local policy and/or practice?

Broadly, this research will collaborate with local education agencies by providing insights on what courses in their schools are helping or hindering women and historically minoritized students progress. This is in line with pillar 3 of the Blueprint for Maryland's Future: College and Career Readiness by developing "A new College and Career Ready standard".

Policies that will be examined include the state's College and Career Ready standard; LEA course requirements and availability including career and technical education, dual-enrollment, and advanced placement or international baccalaureate; and post-secondary admission policies. We will also examine how the current CCR standard relates to different post CCR pathways. Additionally, we will distinguish student course choice from LEA policy/course availability at the school.

We hope to do this by taking the results from our analyses (which will comply with MLDSC Suppression Review standards) and publishing a data dashboard which will be open to the public. This dashboard will allow for people to look at state-wide patterns as well as zooming in on individual LEAs. In addition, Max Anthenelli and other collaborators will coordinate open 'webinars' with each LEA board of education which will allow for administrators, teachers, parents, and even students to pose direct questions about how to interpret the data and analysis.

We also plan on providing an applied methods presentation for the research team. In this presentation, we will explain to the research team how the new methods can be used and why they are useful for future research using MLDS data.

By democratizing these analyses, we hope to make space for counter-narratives that slip through the cracks in large quantitative studies. This will also allow for more nuanced implementation to be considered as the results will, no doubt, vary across Maryland's diverse education landscape.

Explain why this research requires longitudinal cross-sector data?

As we aim to understand relationships between K-12 school and college outcomes, we need access to data from each of these sectors.

Proposed Center Output
(Typical products for the MLDS Center include a research series presentation to stakeholders and a research brief in the MLDS Center template).

We propose creating a research brief in the MLDS Center template. The brief would include tables and charts showing the findings of our analyses, as well as prose descriptions of the research questions, methods of analysis, and the results obtained. This summary will also be included in full in the final report to be shared to any relevant stakeholders.

Additionally, we will host a methods seminar for the research team if there is interest in growing the SCED college extension, or using the causal inference methods we propose.

Timeline for the proposed project (identify major deliverables and approximate dates)

Action Item	Timeline
Analytic data file construction, descriptive statistics, and data analysis	Fall 2025
Presentation in the MLDS Center Research Seminar Series	Spring 2026
MLDS Center Product: Research Summary Report	Spring 2026
MLDS Center Product: Methods Seminar	Spring 2026

Plans for further development (i.e. journal submission, etc)

We intend to write academic articles based on this analysis and publish them in peer-reviewed journals.
We also plan to distribute the findings through presentations at academic conferences and policy briefs shared to other relevant stakeholders. Additionally, Max Anthenelli will include some of these analyses in his dissertation.

Section 3. MLDS Center Research Agenda

Does your project relate to one of the following areas which the General Assembly has specifically directed the MLDSC to study:	**Yes**	**No**
The impact of a State or federal education program?[1]	X	
The performance of educator preparation programs?		X
Best practices regarding classroom instruction?	X	
The impact of child welfare programs on the educational and economic outcomes of students?		X
An analysis of social determinants, provided by State agencies[2] and appropriate local agencies, that impact education performance of students and indicate the need for wraparound services for students.		X
Does your project use State or Federal financial aid[3] data?		X

If you are requesting to use FAFSA data please explain how this research will benefit the administration of Title IV federal financial aid.

Research Agenda Category (page 2 of the Research Agenda) – Which category does the project address? Please explain.

[1] All projects must relate to a state or federal education program. If you are not sure, please contact ross.goldstein@maryland.gov.
[2] State agencies include: Maryland Department of Health, Department of Human Services, and Department of Juvenile Services
[3] Financial aid data derived from the FAFSA may only be used in research to improve the administration of federal financial aid programs.

1. Pathways and Pipelines: we are looking at the STEM pathway, by following students from grade-school and onto college outcomes, and comparing students with different Post CCR pathway availabilities, but similar backgrounds otherwise. We can identify policies dictating course offerings and graduation requirements that are helping or hindering women and historically minoritized students reach STEM careers. 2. Methodological Inquiries: we are developing new methods borrowing from advancements in statistics to implement in education policy research.
Research Agenda Themes (page 2-3 of the Research Agenda) - Which cross cutting theme is incorporated in the project? Please explain.
Supports & Barriers: Our aim is to recommend course offerings that diversify the students entering the STEM career pathway. Social Determinants: examining correlational and causal relationships of race/ethnicity, gender, SES, school characteristics.

Section 4. Data and Cross Sector Analysis

Please review the MLDS Center Data Inventory and the MLDS Center Data Gap Analysis prior to completing this section.

Sectors* *The data falling within each sector is outlined below. The purpose of this section is to ensure the project is cross sector. Projects will not necessarily use all data elements within the sector (see methods section for definitions of measures).	**X**
Early Childhood Education Sector	
K-12 Education Sector	X
Adult Education Sector	X
Justice Involved Youth Sector	
Child Welfare Sector	
Postsecondary Education Sector	X
Other Completions and Credentials Sector	
Workforce Sector	

Put an 'x' next to each data sector your project will include. You must have at least 2 sectors.

Do you plan to request to include external data as part of your project?
No

***Sectors**

Early Childhood Education Sector
- PreK Academic Engagement

K-12 Public School Education Sector
- Enrollment and attendance
- Assessments
- Courses and grades
- Completions
- Discipline
- Public School Characteristics

Adult Education Sector

Child Welfare Sector
- Out-of-Home Placements

Postsecondary Education Sector
- College and University Enrollment
- College and University Courses, Credits and Grades
- College and University Degrees
- College and University Workforce Training
- Financial Aid

Other Completions and Credentials Sector

- GED/NEDP Exam Results
- Apprenticeship
- Adult Education
- Correction Education

Juvenile Justice Sector

- Juvenile Justice Records
- Juvenile Education Records
- Industry Certifications
- Licenses

Workforce Sector

- Public School Teachers
- Public School Staff
- Workforce visibility/participation
- Workforce Earnings
- Workforce Industry

Section 5. Financial Information

The MLDS Center incurs costs for every project related to: (a) IT support and infrastructure; (b) assistance from subject matter experts, (c) criminal history background checks; and (d) creation of an analytic data set. Average project costs are between $1,000 and $3,000. A detailed, customized estimate will be provided prior to project initiation. (Please indicate your answer with an "X)

X	I will reimburse MLDSC for all applicable fees.
	I will only be able to provide partial reimbursement.
	I will need a waiver.

Grant Funding (indicate with an 'X')

	This project has already received funding
X	I plan to apply or am in the process of applying for grant funding
	No grant funding is planned

Name of Grantor

National Science Foundation

RFP or Grant Program Information (you may provide a link to the grantor's website)

1. https://new.nsf.gov/funding/opportunities/ecrcore-edu-core-research
2. https://new.nsf.gov/funding/opportunities/drk-12-discovery-research-prek-12
3. https://new.nsf.gov/mps/dms

Amount of grant funds sought or awarded.

Grant Application Date

(1) 10/2/25
(2) 11/12/25
(3) 12/15/25

Do you intend to proceed without grant funding?

Yes

Are you receiving other funding for this proposed project? If yes, how much?

No

Section 6. Special Considerations

Principal Investigators NOT affiliated with a Maryland College or University – please provide information on: **a. Your familiarity with Maryland policies affecting your research topic; and** **b. How your project meets a specific Maryland research need?** **Please also upload (with this form) any letters of reference or endorsement from a Maryland researcher or a State or local agency that vouches for your qualifications and expertise.**
For projects that involve a small population, please confirm that you are aware of the MLDS Center's data suppression policy and explain how you will report your findings while conforming to the suppression requirements.
For projects that involve a single school system, university, or program, please explain the statewide implications of the project. **Please also upload (with this form) any letters of support from the subject (i.e. school system or university) of the study.**

Section 7. Project Team

Project Team

- **Please list all members of the research team and indicate roles and responsibilities.**
- **If the Principal Investigator listed in Section 1 above is NOT the primary point of contact for the project (including research, data access, and presentations to stakeholders), please indicate which team member is the primary point of contact and provide that individual's contact information.**

Name and Organization	Role	Is system access needed? (Yes/No)
Lizhen Lin, University of Maryland College Park	Co-PI	View-Only
Nathaniel Josephs, North Carolina State University	Co-PI	Yes
Rolonda L. Payne, University of Maryland College Park	Co-PI	Yes
Max Anthenelli, University of Maryland College Park	PI	Yes (Already has it)

Section 8. Submission

Once this form is completed, please complete the online application (here) and upload this form, CVs for all members of the research team, and any other supporting materials.