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## Project Description I

Title:

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An Analysis of the Effects of State Financial Aid Policy on the Timing of Postsecondary Enrollment: A Focus on Income and Race Differences

Statement of the research problem and national importance:

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Traditionally it has been a goal of financial aid policy to break the link between family socioeconomic background and college opportunities (McPherson & Schapiro, 2006). The first Higher Education Act in 1965 formalized the system of student aid programs that established a commitment to expanding college opportunities for economically disadvantaged students. The rise in broad-based state merit-aid programs since the early 1990s, however, represents one of the most pronounced policy shifts away from a long tradition of need-based aid. As the first of its kind, since Georgia's HOPE (Helping Outstanding Pupils Educationally) scholarship began in 1993, fourteen more states have adopted state merit-aid programs modeled after HOPE (Heller & Marin, 2002). Spending on these state-sponsored scholarship programs grew 348 percent during the past decade (compared to 99 percent growth in need-based programs), and provided a "combined \$1.2 billion yearly for college students on the basis of academic qualifications, over three times the \$350 million provided in need-based aid by the states" (Heller & Rogers, 2006, p. 105).

This statewide shift in financial aid policy translates into an overall decline in need-based aid, having negative implications for college opportunities of low-income students (Heller & Rogers, 2006).

The changes in public financial aid policies pose particular barriers to postsecondary choices of underrepresented student populations, resulting in widening income and racial/ethnic gaps in college attendance over time (Ellwood & Kane, 2000). Although college enrollments have continued to grow since the 1970s, numerous studies reveal that the enrollment growth has been mostly attributable to students from middle- and upper-income families (Belley & Lochner, 2007; Kane, 2006). In terms of race/ethnic disparities, African American and Hispanics continue to be underrepresented in colleges and universities compared to their white and Asian counterparts (Perna, 2000; Tierney, 1999). Consequently, disparities in college attendance rates by family income and race/ethnicity have persisted over time, and the gaps are particularly pronounced in four-year college participation rates (Hearn, 2001; Kane, 2004).

Studies have further revealed that a growing population of low-income students who eventually get to college are disposed towards nontraditional forms of attendance by postponing college enrollment after high school completion (Goldrick-Rab, 2006; Rowan-Kenyon, 2007). Delaying college enrollment poses a clear disadvantage for these students because it is likely to lower postsecondary educational attainment. Studies demonstrate that the delayed time between high school graduation and college enrollment substantially increases the chances of attending less-than-four-year institutions and increases college dropout rates, while decreasing the chances of a bachelor's degree attainment (Ahlburg, McCall, & Na, 2002; Bozick & DeLuca, 2005).

Given the tightening relationship between family financial resources and postsecondary opportunities, research on student aid indicates that college costs and financial aid have a direct effect on college enrollment and the choice of institutions, and that low-income and minority students are more responsive to tuition and financial aid in the form of grants (Heller, 1997; Long, 2004). Despite the extensive literature on the role of financial aid policies in student enrollment decisions, researchers have paid limited attention to exploring socioeconomic and

race/ethnic differences as well as the role of financial aid associated with the *timing* of student enrollment. Given that high school graduates enroll in college at different time points and financial aid is an important predictor of *whether* and *where* a student enrolls as well as *when* a student enrolls in college, this study will fill the void in the research by exploring the effects that state financial aid policies have on the occurrence as well as the timing of initial enrollment for high school graduates (or equivalent diploma holders). This study will especially focus on whether and how state aid policies differentially affect individual students' time to enrollment depending on their family income and race/ethnicity.

Given growing nontraditional student populations in higher education due to delayed enrollment in recent years, the study's modeling of the timing of enrollment will provide timely insights into identifying the temporal aspects of college enrollment and the role that state aid policy plays in postsecondary enrollment. Enhanced understanding of the temporal process of postsecondary enrollment and the effects of state financial aid on students' enrollment decisions will assist policymakers in designing public financial aid policies in a way that promote on-time college enrollment. This study will further assist policymakers in identifying the differential impact of financial aid on the enrollment timing for students from different income and race/ethnic groups, and thus will provide better understanding of income and race/ethnic gaps in enrollment timing and the effectiveness of financial aid policy in reducing such gaps.

Review the literature and establish a theoretical grounding for the research:

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Researchers have widely investigated student transition from secondary to higher education utilizing college choice models based on both economic and sociological perspectives. As the primary economic theory applied to the study of college choice, human capital theory views college choice as a form of rational investment in the acquisition of human capital that maximizes an expected utility (or net benefit) under a cost-benefit analysis (Paulsen, 2001). The theory predicts that prospective students decide whether to attend college and select among a range of

institutions only if the expected benefits (e.g., financial aid, future income) outweigh the anticipated costs of their choice (e.g., tuition and fees, living expenses, and foregone earnings) (DesJardins & Toutkoushian, 2005).

While economic theory has been useful in conceptualizing the role of finances in college choice, sociological approaches focus on the impact of social class and family background in shaping college opportunities. Among the theoretical lenses of sociology, the theory of cultural capital illuminates how students from different social classes make varied educational choices conditioned by their possession of the cultural capital (St. John, 2006). In light of cultural capital theory, college education becomes a valuable means of acquiring the credentials and knowledge that ensure continuing social and economic security of a family. Relative to lower-class parents who lack cultural capital, upper-class parents are better positioned to “transmit cultural capital by informing their children of the value and process for securing college education” (McDonough, 1997, p. 9). Types of cultural capital relevant to college choice include parental knowledge of college preparation, information about college affordability, and parents’ educational expectations and involvement (Rowan-Kenyon, 2007).

College choice models typically involve multiple stages of the process that situates critical social and financial factors impacting students’ college choice decisions. A widely referenced college choice model proposed by Hossler and colleagues (1987) defined three stages, where students 1) develop aspirations for college attendance (*predisposition*), 2) search for information about colleges and develop a choice set (*search*), and 3) apply to and choose to enroll in a particular college (*choice*). This staged process, however, may be applicable mostly to traditional college-age students who make a straight transition from high school to college, and offers limited insights into the choices made by students who postpone college enrollment after secondary schooling. In other words, the traditional college choice model addresses the continuous process of college choice for those who attend college immediately after high school completion, and does not account for the choice of nontraditional students who have had an interruption in their study after high school graduation. The different timing of college enrollment after one’s high school completion suggests the need for revising a college choice

model: adding a *time* dimension to the existing college choice model in an attempt to consider individual variations in time-to-initial postsecondary enrollment.

Examining the economic and sociological perspectives frames the significance of socioeconomic background as well as of college costs and financial aid in college choice. It has been evident that SES is a key determinant not only of developing college aspirations, but also of enrollment choices in that low-SES students are less likely to enroll in any type of institutions than their advantaged counterparts (Baker & Velez, 1996; Hearn, 1984, 1991). In addition, a student's racial/ethnic background independently shapes the levels of educational attainment in that African Americans and Hispanics have consistently been underrepresented in highly selective institutions (Freeman, 1999, 2005; Perna, 2006).

With regard to the impact of finances, research has confirmed that students from different socioeconomic and race/ethnic groups respond differently to student aid than they do to tuition, and respond differently to each type of financial aid in their enrollment and the choice of institutions (DesJardins, 2001; Heller, 1999; Paulsen & St. John, 2002). For instance, research on state grants have found positive influences of need-based grants on college choice and enrollment decisions of low-income students (Perna & Titus, 2004; St. John, et al., 2004). However, studies suggest that merit-based programs had a disproportionate impact on the choice to attend in-state four-year institutions for students from white and middle- to upper-income families, while having little impact on minority and low-income students' college opportunity (Cornwell, Mustard, & Sridhar, 2006; Dynarski, 2000). The stronger influence of merit aid found among whites and upper-income students may be a natural consequence of the fact that state merit aid, unlike need-based aid, is awarded disproportionately to whites and those from wealthier families (Heller & Marin, 2004).

Research on federal aid have reported a positive impact of federal grants on eligible needy students' college enrollment. One study revealed that the Pell grant availability had a sizeable effect on the probability of enrollment among non-traditional students (Seftor & Turner, 2002). Another study that examined the Pell effect focused on how tuition increases that vary across institutions and regions are related with Pell recipients' enrollment choices. Singell and Stone(2007) found that

tuition costs have increased more for institutions located in some states than others, and Pell recipients with larger awards were drawn more toward private institutions with lower tuition or public institutions with higher tuition within their own states. In addition to the Pell, elimination of other forms of a federal grant program (i.e., Social Security Student Benefit in 1982) was found to have a negative impact on college enrollment of students who would otherwise have been eligible for the grant (Dynarski, 2003). Although the distribution of Pell recipients and expenditures varies substantially by states (Cook & King, 2007), there has been few existing research that examined how the influence of federal aid varies by states.

Although the existing studies have paid proper attention to socioeconomic and race/ethnic differences in the impact of public financial aid policies on college choice, they are subject to the following limitation. Most studies that address the association between state-level financial aid policy and students' college choice behavior have modeled this relationship without considering the longitudinal (or temporal) process of enrollment decisions. Furthermore, prior studies failed to consider the time-variant nature of financial aid policies suggesting that yearly changes in state-level financial aid policies may affect students' enrollment decisions in the state in addition to their timing of enrollment once they decide to attend college. Studies that fail to consider temporal dimensions often made inferences based on cross-sectional data that contains information only about a single point in time, and employing cross-sectional methods may produce biased results by ignoring the choice of students who enrolled in college at later points in time as well as by ignoring time-varying information about financial aid policies that change over time. Therefore, it is critical to consider the temporal nature of college enrollment as well as to test whether the effects of financial aid policies differ by students' income and race/ethnicity over time by utilizing an appropriate longitudinal model that enables us to investigate the choice of students from varied background who enrolled in college at different time points. Reflecting the need to allow an extended time dimension, the Appendix Figure 1 illustrates the conceptual framework used for examining the role of state financial aid policies in individual students' enrollment decisions as well as their timing of enrollment.

Describe the research method that will be used:

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The purpose of this study is to investigate the following questions:

1. Do time-to-enrollment trajectories differ for high school graduates who are from different income and race/ethnic groups?
2. Do state-level financial aid policies influence a student's decision of whether and when to enroll in college as well as to enroll in specific types of institutions after completing high school?
3. Does the effect of state financial aid on college enrollment vary for students from different income and race/ethnic groups?

#### *Data Sources and Sample*

This study will use data from the National Education Longitudinal Study (NELS: 88/2000). NELS followed almost 25,000 eighth-grade cohorts through their high school graduation and later postsecondary education or employment path from 1988 (when students were eighth graders) through 2000 (eight years after their scheduled high school graduation). Because high school completion is a prior condition necessary for transition to postsecondary enrollment, the study sample is restricted to students who completed high school (or attained an equivalent diploma) in or after 1992 and who provided information on whether or not they attended postsecondary institutions by the year 2000 (N=10,814).

In order to link state-level finance policies into student-level analysis, I merge the NELS data with aggregated state-level data developed by St. John and colleagues for the years between 1992 through 2000 (St. John & Chung, 2006). Constructed from the sources including the National Association of State Student Grant & Aid Programs (NASSGAP), Integrated Postsecondary Education Data System (IPEDS), and the U.S. Census Bureau, this dataset contains a set of biannual (i.e., 1992, 1994, 1996, 1998, and 2000) state financial, educational, and demographic indicators for each state.

#### *Outcome Variables for the Study*



Two types of outcomes will be used for this study: 1) A dichotomous variable indicating whether or not a student enrolled in a postsecondary institution (0=not enrolled, 1=enrolled) and 2) a three-category multinomial measure that differentiates two-year and four-year enrollment (0=not enrolled, 1=enrolled in two-year institutions, 2=enrolled in four-year institutions). Distinction between enrollment in two-year and four-year institutions is tested because studies report differential socioeconomic benefits associated with attending the different type of postsecondary institutions (Ehrenberg, 2004).

#### *Independent Variables and Controls*

The independent variables used in the model consist of student-level and state-level variables and a list of variables is provided in the Appendix Table 1. Student-level variables include socio-demographic factors (e.g., gender, race/ethnicity, high school location, parental income and education), postsecondary aspirations, parental influences, academic preparation, and information on financial aid measured when they were 12<sup>th</sup> graders. These group of variables have been recognized as important determinants of college choice and enrollment (Adelman, 2006; Perna & Titus, 2005) and thus are included to control for students' self-selection into enrolling or not enrolling in college.

State-level variables include variables related to state financial aid policy (including need-based aid and non need-based aid) and public college tuition, as well as demographic and educational indicators for each state (e.g., state per capita income, poverty rate, unemployment rate, college continuation rate). State funding for public institutions as well as in-state public tuition are controlled for in order to distinguish the effect of financial aid policies from that of state tuition and appropriations.

#### *Statistical Method*

This study employs event history methods to capture the temporal nature of postsecondary enrollment. Event history modeling is an empirical technique that allows us to "study the occurrence and timing of events" in a longitudinal process (DesJardins, 2003), and has been recently used in higher education research to investigate the temporal aspects of student dropout and degree completion (Chen, 2008). Defined as a transition from one state to another, the event modeled in this

study is the transition from high school to college. A student can choose between different types of institutions (e.g., two-year and four-year institutions), and students' *initial* choice to enroll in two-year institutions and in four-year institutions is considered a transition to separate states. Even if students may enroll in more than one institution at one time (Adelman, 1999; Melguizo & Dowd, 2009), this study focuses on the type of the first (or initial) postsecondary institutions attended by students and does not account for multi-institutional enrollment.

An advantage of event history methods is its ability to incorporate time-varying covariates that change their values over time, and all state-level variables used in the study change their value every other year. Inclusion of these time-dependent covariates in the event history modeling enables studying change processes that unfold over time and thereby alleviates time-related sensitivity and non-random selection problems that have plagued researchers when making causal inferences. Finally, due to the nested structure of the data (i.e., students are nested within states), a clustered event history model by states will be utilized to deal with the statistical dependence between students who reside in the same state.

### *The Statistical Model*

An event history model that estimates the relationship between state financial aid policy and postsecondary enrollment is modeled using either the logit link function for a single-event model or multinomial logit link function for differentiating two-year and four-year enrollment. The model is formally specified as:

$$h(P_{tij}) = \beta_0 + \beta_1 x_i + \beta_2 z_j(t) + \beta_3 \text{Time}_{ti} + \beta_4 \text{State}_{ji}$$

where, using logit link,  $h(P_{tij})$  is the probability that an individual  $i$  who resides in a state  $j$  enrolls in college in time period  $t$ , given that she or he has not experienced the event prior to that time. When estimating a multinomial logit model  $h(P_{tij})$  represents a probability indicating whether an individual  $i$  who resides in a state  $j$  enrolls in a two-year or four-year institutions in college in time period  $t$ , relative to those who did not enroll in any type of postsecondary institutions.  $x_i$  is a vector of student-level time-constant covariates (e.g., race/ethnicity, gender), whereas  $z_j(t)$  is a vector of state-level time-varying covariates that change over

time. In order to capture the variation of state aid effect by race and income groups, interactions between race/income and the types of state aid are also included in the model.  $Time_{it}$  denotes a vector of time-dummy indicators (assigned one for each year an individual  $i$  enrolls in college) that control for the effect of time.  $State_{jt}$  denotes state fixed-effect dummy variables that represent each state, which is included to control for unobserved state-specific effects on a resident's enrollment behavior.

Will you address the NPEC focus topic? Yes

If yes, please briefly describe: In examining the relationship between state financial aid policy and postsecondary enrollment, the present study focuses on examining differences in time-to-enrollment trajectories for high school graduates who are from different income and race/ethnic groups. The study will also examine how the effect of state aid policy varies by race and income groups, which are important components of socioeconomic characteristics. By identifying which types and how much investment in state financial aid matter for on-time enrollment of students from disadvantaged backgrounds, this research will provide empirical evidence that can support low-income and/or minority students' immediate and successful transition to higher education. In this respect, this study effectively addresses the NPEC focus topic, "Socioeconomic factors in postsecondary education."

This study also has an implication for the application of the NCES data to the study of students' college access and choice. Given that contextual factors and public policy circumstances are increasingly found to affect an individual's postsecondary decisions, this study will help illuminate the ways in which national student-level data can be used together with different sources of state-level measures to better inform the process of student enrollment. Finally, this study's inclusive examination of students who delay college enrollment points to the need for knowing more about educational processes of these non-traditional students after secondary schooling. This need implies collecting more frequent post follow-up information and data at a time between students' expected high school graduation and the termination of the study.

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## Project Description II

Will you use NCES target dataset? Yes

Please check all NCES datasets that apply

- National Education Longitudinal Study of 1988 (NELS:88)

Explain why each dataset best serves this research. Include a variable list for each dataset used.

This study will use data from the National Education Longitudinal Study (NELS:88/2000). Since the beginning of the baseline survey was conducted in 1988 when students were eight graders, the NCES conducted four follow-up surveys in 1990, 1992 (scheduled high school completion), 1994, and 2000 (eight years after scheduled high school completion). The NELS data provide information regarding a specific year and a month a student completed high school (or equivalent diploma) for high school completers as well as the year and month of students' initial postsecondary enrollment among higher education enrollees. This temporal information with regard to when a student graduated high school (or earned equivalent diploma) and enrolled in postsecondary institutions allows me to model the occurrence and the timing of each student's transition from high school to postsecondary institutions over time spanning from 1992 through 2000. The eight years of following time since the scheduled high school completion is long enough to allow postsecondary enrollment for those who intend to pursue higher education.

In addition, the NELS data provide rich information about students' background information and precollege academic-related characteristics that may affect a student's decision to enroll in higher education. The list of variables used is: gender, race/ethnicity, family income measured in 1991, parental education, region of high school location, postsecondary aspiration, parental education expectation



and involvement, information about financial aid, high school GPA, reading and math standardized score, curricular program, and the type of high school.

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Will you use NSF target dataset? No

Explain why each dataset best serves this research. Include a variable list for each dataset used.

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Will you address the NPEC focus topic? Yes

If yes, please briefly describe:

In examining the relationship between state financial aid policy and postsecondary enrollment, the present study focuses on examining differences in time-to-enrollment trajectories for high school graduates who are from different income and race/ethnic groups. The study will also examine how the effect of state aid policy varies by race and income groups, which are important components of socioeconomic characteristics. By identifying which types and how much investment in state financial aid matter for on-time enrollment of students from disadvantaged backgrounds, this research will provide empirical evidence that can support low-income and/or minority students' immediate and successful transition to higher education. In this respect, this study effectively addresses the NPEC focus topic, "Socioeconomic factors in postsecondary education."

### Project Description III

Provide a timeline of key project activities:

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Timeline of Key Project Activities

	Research Activities	Time Period
1	Review and analyze the relevant literature	May 2010 - June 2010
2	Analyze the NELS data and create event-history dataset	July 2010 – September 2010
3	Prepare and submit a conference proposal to AERA	July 2010
4	Run descriptive analyses and test event history models	October 2010 – December 2010

5	Prepare and submit a conference proposal to AIR	October 2010
6	Present preliminary research finding in ASHE	November 2010
7	Finalize event history models	Jan 2011 – Feb 2011
8	Present the research finding in AERA	April 2011
9	Prepare and submit a conference proposal to ASHE	April , 2011
10	Present the research finding in AIR	May 2011
11	Prepare and complete the final report	March 2011– April 2011
12	Submit the final report to AIR	May 2011

List deliverables such as research reports, books, and presentations that will be developed from this research initiative:

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I will present my research findings from this study at the 1) 2010 ASHE conference, 2) 2011 AIR Forum, and 3) 2011 AERA annual meeting. In addition, I will develop the conference papers further to make it publishable in higher education journals. I will submit the manuscript to 1) Research in Higher Education and 2) The Journal of Higher Education. I will also submit the final paper (which is part of the NPEC focus topics) to AIR by June 2011.

Describe how you will disseminate the results of this research:

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The results of the present study will be disseminated mainly through conference presentations and journal publications. Conference proposals will be submitted to the major higher education conferences such as AIR and AERA this summer and fall, and the study results will be presented to other researchers at the 2011 AIR Forum and at the 2011 AERA annual meeting. Based upon the feedback and suggestions from the conference presentations, more complete manuscripts will be submitted for publication consideration to peer-reviewed journals including *Research in Higher Education* and *The Journal of Higher Education*.

Provide a reference list of sources cited:

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## **IRB Statement**

Statement of Institutional Review Board approval or exemption:

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When notified of the AIR funding decision, I will contact the IRB office at the University of Michigan to be informed of the necessary procedures to follow. In addition, I will contact the NCES person for requirements and procedures in order to use the restricted dataset provided by NECS.

## **Statement of Use of Restricted Datasets**

Currently I have the license to have access to the restricted datasets provided by NCES, and the license allows me to use the NELS restricted dataset in order to address my research question of this study.

## Biographical Sketch

I am a doctoral candidate at the Center for the Study of Higher and Postsecondary Education (CSHPE) in the University of Michigan. Upon completing a bachelor's degree from Seoul National University (in South Korea), I gained employment as a government official in the Korean Ministry of Education, Science, and Technology. Working for three years in the Ministry, I had the responsibility of heading educational service negotiations on liberalizing domestic colleges and universities to foreign higher education providers in several international meetings held by the World Trade Organization. This work experience led me to develop initial interests in the study of higher education and to pursue graduate study. For my graduate study in the U.S., I was awarded a two-year Fulbright fellowship sponsored by the Korean-American Educational Commission.

Coming to the U.S., I earned my M.A. in higher education at the University of Michigan and made a straight transition to my doctoral study. Through extensive doctoral coursework and involvement in research projects as a research assistant, I have accumulated knowledge and strong analytical skills essential for conducting my dissertation research. I have taken several research and evaluation courses including economics of education, public policy research and analysis in postsecondary education as well as advanced statistics courses such as logistic regression, applied econometrics, multilevel analysis, structural equation modeling, and survival analysis from the School of Education, the School of Public Policy, the department of Economics, and the department of Biostatistics. Taking these courses enabled me to understand the basics and essentials of longitudinal modeling as well as appropriate statistical techniques to analyze longitudinal data. In addition to my

coursework, I was selected to participate in the database training seminar co-sponsored by the American Educational Research Association (AERA) and the National Center for Educational Statistics (NCES) in spring 2008. This seminar provided an opportunity to work with large educational datasets such as the National Education Longitudinal Study of 1988 and the Education Longitudinal Study of 2002.

As a research assistant, I have been involved in research projects relevant to financial aid policy and student access to college in both the national and international contexts. I wrote a paper with Professor Ed St. John that explores the impact of national financial aid and tuition policies on college enrollment for 30 OECD (Organization of Economic Cooperation and Development) countries. To conduct this analysis I prepared the panel dataset using an online database provided by OECD (*Education at a Glance*) and World Development Indicators (WDI) collected from the World Bank for the period between 1998 and 2005. The results from this project were published in a monograph series by the University of Houston in 2007. I also wrote a paper that examines the effects of student expectations about financial aid on college choice with a special focus on racial and income differences in collaboration with Professor Stephen DesJardins. This paper was presented in the 2008 Association for the Study of Higher Education (ASHE) conference and was published recently in *Research in Higher Education*. This series of research experiences relevant to financial aid and college choice led me to pursue my dissertation project exploring the effects of state-level financial aid policy on the timing of postsecondary enrollment. Based upon academic knowledge and relevant research experiences, I am interested in further exploring the



association between college choice and financial aid policy in South Korea in the near future where institutions of higher education are highly privatized and public funding for student financial assistance is much less available than in the U.S.

**Budget Requirements**

Salary/Stipend: \$9,500.00

Tuition and fees: \$4,500.00

Travel: \$1,500.00

Other travel related expenses: \$1,500.00

Other research expenses: \$2,000.00

Total Request: \$19,000.00

**Funding History**

I have applied for two other dissertation grant programs sponsored by Spencer Foundation and AERA, and the nomination results will be notified by April 2010. I have never received funding from AIR