

THE MENTORING HANDBOOK FOR UNDERGRADUATE RESEARCH
AT NEW YORK CITY COLLEGE OF TECHNOLOGY
OF THE CITY UNIVERSITY OF NEW YORK

Prepared by The Undergraduate Research Committee

City Tech Logo

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Introduction and Overview

Research has demonstrated that mentoring is critical to the personal and professional growth of individuals. There are many models and opportunities available for mentoring, all of which have developed with the advent of time and technology. Some institutions may choose to run mentoring circles or groups, where mentors facilitate the growth of individuals. Other institutions may prefer peer mentoring in pairs or groups where individuals mentor each other, or may prefer a combination of mentoring approaches. In either case, the evolution of the very definition of mentoring itself has brought a present-day uniqueness to the process. Mentoring is no longer specific to the business world where the older and wiser male individual lends guidance to the younger male protégé. Contemporary mentoring knows no specific age, discipline, gender, length of time, or opportunity for contact between individuals. Regardless, mentoring in its ideal form is a mutually satisfying relationship where the experience of life enriches effective and positive learning.

Mentoring programs can provide the opportunity for undergraduate students to engage in research with positive role models who are also accomplished faculty members. *The Mentoring Handbook for Undergraduate Research at New York City College of Technology of the City University of New York* is a toolkit that provides mentoring approach tips. This approach to undergraduate research, and resources to enable that the research endeavors of undergraduate student mentees and their mentors be as successful as possible.

The Mentoring Handbook for Undergraduate Research is organized as follows:

Section 1. Mentoring: A Promising Strategy for Success. This section contains a brief review of the literature on effective mentoring strategies. Our mentoring philosophy, based on a learner-centered mentoring paradigm, emphasizes the shift from “sage on the stage” to the “guide on the side.” Information on the diversity of New York City College of Technology (City Tech) is also available.

Section 2. Laying the Foundation: The Mentoring Journey. This section lays the groundwork for mentoring. The section contains descriptions of support roles in mentoring, primary components of the mentoring process, types of mentoring, and stages of the mentoring process. Case studies illustrate the concepts, and exercises may be used as self-reflection and assessment tools as we lay a solid foundation for building an effective learning relationship.

Section 3. Characteristics of Effective Mentors and Mentees. This section contains information and exercises to help describe mentor and mentee characteristics, ideal expectations of mentors and mentees, benefits and challenges of becoming a mentor, and checklists to streamline the mentoring process.

Section 4. Developing a Mentoring Program of Undergraduate Research. This section discusses how to start developing a mentoring plan. It contains specific tools and resource links designed to implement a mentored undergraduate research program.

Section 5. Evaluation and Tools. This section contains tools for inputs, processes, and outcomes, including individual and process checklists and evaluations, program surveys, and web-based evaluations. *The Mentoring Program of Undergraduate Research* Web Site link is provided for knowledge dissemination and promotion. In addition, external links to international, local, and national mentoring activities, specifically those focused on faculty member-mentee research, are included.

The purpose of *The Mentoring Handbook for Undergraduate Research at New York City College of Technology of The City University of New York* is to:

- Provide an overview of the City Tech Undergraduate Research Mentoring Program
- Describe the concepts and benefits of mentoring
- Describe the phases of the mentoring relationship
- Define the roles of the faculty member mentor and undergraduate student mentee
- Provide strategies for being an effective mentor
- Provide strategies for being a successful mentee
- Provide tools to help the faculty mentor manage the mentor-mentee relationship
- Provide mentoring resources and references.

Vision and Mission

Vision

To be a model of excellence for undergraduate research mentoring within The City University of New York educational system.

Mission

Our aim is to have those New York City College of Technology faculty member mentors and mentees engaged in undergraduate research feel supported in their pursuit of satisfying and successful research endeavors.

Draft

Program Goals

Support and facilitate faculty member mentor development through research mentor/mentee pairs, individual, teams, or groups.

Provide accurate, timely information and counsel regarding the development, advancement, and promotion of undergraduate research at City Tech.

Identify a comprehensive mentoring curriculum to support the research development of faculty and their mentees engaged in undergraduate research in as many disciplines as possible.

Build a mentoring database of processes and outcomes to support and evaluate mentoring activities.

Provide a central structure, core leadership, resources, and support for faculty members and their mentees engaged in the research mentoring process.

Program Core Components

Director (and role description). For example: Oversee program for faculty members and mentees engaged in research at City Tech

Faculty Member Mentors (and role description). For example: Responsible for setting up and overseeing faculty mentor/mentee research mentoring program within their respective disciplines at City Tech

One on One (or Team) Mentoring Program: Faculty members conducting research are paired with/teamed with undergraduate mentees

Recognition for Mentors and Mentees. For example: Awards, certificates, luncheons, posters, publications, presentations, press coverage/releases

Core Curriculum. For example: Invited speakers, meetings, retreats, seminars, workshops, and topics, which include manual components

City Tech Academy of Mentors (Faculty Involved)

Evaluation and Tools. For example: Inputs, process, and outcome; individual and process checklists and evaluations, program surveys, web-based evaluations

Mentoring Program Web Site (for knowledge dissemination and promotion)

External Links (to international, local, and national mentoring activities, specifically those focused on faculty member-mentee research)

Mentoring Resources

Mentoring Development

City Tech Faculty Mentor Listserv and Directory

Section 1. Mentoring: A Promising Strategy for Success.

This section contains a brief review of the literature on effective mentoring strategies. Our mentoring philosophy, based on a learner-centered mentoring paradigm, emphasizes the shift from “sage on the stage” to the “guide on the side.” We address culture and the importance of its consideration whenever engaging in mentorship. Information on the diversity of New York City College of Technology (City Tech) is also available.

What is Good Mentoring?

An extensive review of the literature on mentoring literature dating back to the 1970s reveals that there is still no consensus on a universal theoretical definition of mentoring in any discipline, although the notion of mentoring is somewhat familiar both as an experience and as an ideal (Egues, 2010). According to Thorpe and Kalischuck (2003), the concept of mentoring is ancient, dating back to Greek mythology. The word “mentor” was inspired by Homer’s character in the epic poem The Odyssey. Mentor, an old and trusted friend of King Odysseus was asked to guide his young son Telemachus during the King’s absence. Athena, the Goddess of Wisdom, would often disguise herself as Mentor to council Telemachus in his time of struggle.

Let’s look at the evolution of contemporary mentoring:

Source	Mentoring Attributes	Mentoring Behaviors
Kram (1985a)	Career development Psychosocial support	Exposure, protection, sponsoring, teaching the job, teaching the informal system Encouragement, personal counseling, role modeling
Stewart and Krueger (1996)	Career development, relationship duration of several years, knowledge differential between participants, reciprocal role, resonance, and teaching-learning process	
Snell (1999)	Multiple activities of support	Coach, connector, devil’s advocate, empathizer, guide, joint problem solver, mirror, ratifier, referee, and sounding

		board
Bozeman and Feeney (2007)	Process of communication during a sustained time period between an individual with greater relevant experience, knowledge, or wisdom (the mentor), and an individual perceived to have less (the protégé)	Support relevant to career, professional, or work development

Of late, the literature reflects that mentoring is recognized as a mutually beneficial process that enables both the personal and professional growth of mentor and protégé (mentee). It is this process that we look toward for mentoring of undergraduate students involved in research.

Why is Mentoring Essential?

The success of mentoring relationships as a critical career resource for employees in organizations may be likewise translated into success of mentoring relationships as a critical career source for undergraduate students in research. Historically, mentors are individuals with advanced experience and knowledge who are committed to providing upward support and mobility to their mentee's careers (Hunt & Michael, 1983; Kram, 1985a). Mentors help their mentees by providing two general types of behaviors or functions: 1) career development functions, which facilitate the mentee's advancement in the organization; and 2) psychosocial functions, which contribute to the mentee's personal growth and professional development (Kram, 1985b). The presence of a mentor is long been associated with an array of positive career outcomes, including career satisfaction (Fagenson, 1989), higher incomes (Chao, Walz, & Gardner, 1992; Dreher & Ash, 1990; Whitely, Dougherty, & Dreher, 1991), more mobility (Scandura, 1992), and more promotions (Dreher & Ash; Scandura), than individuals who have no mentors. Mentoring has also been found to have a positive impact on job satisfaction (Koberg, Boss, Chappell, & Ringer, 1994), organizational socialization (Ostroff & Kozlowski, 1993), and reduced turnover (Viator & Scandura, 1991). Indeed, these basic tenets and outcomes of mentoring for mentees have remained consistent to the present.

Most mentoring programs are primarily designed for the benefit of mentees. Participants are encouraged to come into the relationship with specific expectations and goals. For mentees, benefits from a mentoring relationship may also include the following: ability to develop mentoring relationships in industries where mentoring is not readily available, clear understanding and enhancement of academic and career development plans, developing a lasting

career network, gaining an insider perspective on navigating their chosen career, greater knowledge of career success factors, and identification of skill gaps before leaving school.

What is Our Mentoring Philosophy?

Mentoring at City Tech has a unique institutional perspective. In academia, mentoring is widely accepted as a well-established, high-impact practice across institutions of all stripes. The prevalence of the mentoring model is due in no small part, to its versatility and effectiveness in within a broad spectrum of institutional contexts. A traditional liberal arts college may employ forms of mentoring whose primary objective is to foster student development that successfully moves the undergraduate to the next academic level, most often graduate or professional schools. Alternatively, apprenticeship-based mentoring may work well as an integrated component of vocational training in a community college setting. As the designated college of technology of the City University of New York, the City Tech Mission Statement is clear that it has historically served *“the city and the state by providing technically proficient graduates in the technologies of the arts, business, communications, health and engineering; human services and law-related professions; technical and occupational education; and liberal arts and sciences.”* With an institutional charge of workplace training and career development predicated on the core foundation of the liberal arts, mentoring at City Tech often reflects the strengths, synergies and challenges inherent in its mission.

The bi-level structure of the College bearing 62 baccalaureate, associate and certificate programs spanning a broad array of disciplines, presents exciting opportunities and challenges for mentoring. Add to the mix one of the nation’s most diverse student bodies, in the one of the world’s greatest cities, and one has a rich academic milieu that is indeed highly distinctive. Mentoring has adapted to City Tech’s unique institutional context and assumes many variations across schools, departments, disciplines and programs. Baccalaureate programs, for instance, may employ conventional long-term mentoring strategies (from freshman to senior) while associate-degree and certificate programs necessarily focus on shorter term, semester-based outcomes. Additionally, it is not unusual to find students entering mentoring experiences with faculty “outside” of their chosen programs. This is especially evident within the School of Arts & Sciences where in concert with its own degree programs, it services both the School of Technology & Design and the School of Professional Studies by providing the requisite general education curriculum for the college community. The result is often a peculiar juxtaposition of disciplines, with biology faculty mentoring radiology technology students, or English professors engaging aspiring dental hygienists in literature research projects. The situation often challenges the mentor to develop approaches that foster student development in knowledge, skills and ethics that can translate well into the student’s chosen major and subsequent career path. Not to mention, this formulation can be a natural breeding ground for growing meaningful cross-disciplinary interactions and synergies among programs, departments and schools. Taken together, the uniqueness of City Tech’s mission, its structural organization and vibrant

community of students and faculty, can serve as a fertile institutional incubator for the development of novel approaches to mentoring.

In a college environment, a mentoring philosophy may benefit from considering the learner-centered mentoring paradigm. The more the mentor engages in facilitating the learning process, the more the mentee experiences a climate conducive to learning (Zachary, 2000). The focus on the mentee's learning goals is perhaps one of the biggest challenges in the mentor's work. Consider the following illustrations of mentoring challenges, as our first informal case studies (1.1 and 1.2).

Case Study 1.1 What Just Happened?

Daniel, a well-published and respected Associate Professor at a large, public university, had been assigned by his department to be Robert's mentor. Robert, a new undergraduate student, was highly motivated to learn how to become an exceptional future researcher. Their relationship started out on a mutually positive note, with an easy rapport. Yet, shortly thereafter, the level of interaction shifted dramatically. Daniel assigned Robert to shadow him, to work on his projects, researching whatever topics he assigned. As time progressed, Daniel strictly gave Robert instructions, which Robert followed. As Robert's responsibilities increased, he and Daniel saw each other less. Before long, the communication between David and Robert changed from discussion to bursts of short reports. Little conversation occurred of Robert's learning experience, and no time was made available for raising or answering questions. Exchanges of any kind between mentor and mentee were brief, few, and irregular. Robert was bewildered.

Let's consider the following: What was missing in this relationship between mentor and mentee? Well, to begin, there was no opportunity to discuss and process the learning that was taking place. Shadowing and giving of instruction were insufficient to meet Robert's needs as a mentee, and whatever learning occurred was not optimal. A more positive approach to how to begin to engage in a mentoring relationship follows.

Case Study 1.2 On the Same Page

Linda, a high-achiever, realized she needed to learn and master several skills to achieve a future in research. She approached Samantha, an esteemed and respected Assistant Professor, to be her mentor. At the first meeting, Samantha worked with Linda to put a contract in place. Linda was able to come away from the meeting with clear learning goals that were attainable and measurable. Each time they met, Samantha and Linda reviewed the progress they were making against Linda's learning goals. They set aside consistent and regular time to talk about the level of satisfaction with the relationship, including how each felt they were progressing with their contractual obligations. There was one moment, when Linda wanted to assert herself and consumes more of Samantha's time. But, Samantha had intentionally built reflection period into their regularly scheduled meetings, so both she and Linda could discuss progression concerns. Additionally, Samantha encouraged Linda to attend conferences, seminars and workshops that would contribute to Linda's knowledge base and experiential growth.

Reflection

The two informal case study examples illustrate the difference that focusing on and tending to learning and the learning process can make in a mentoring relationship. The

subservient mentoring relationship between Daniel and Robert is not unique to academia; “running after the professor,” and worshipping “professor as sage on the stage” may indeed be seen as making the experience worthwhile. However, the relationship between Samantha and Linda reflected a more collaborative learning partnership, where the mentor is less authority figure and more facilitator. The more the mentor is engaged in facilitating the learning process, the more the facilitator engages the mentee in the learning process by creating an atmosphere conducive to learning.

Instead of being mentor driven, with the mentor taking full responsibility for the mentee’s learning, the mentee learns to share the responsibility for the following: 1) the learning itself, 2) the priorities of the relationship, 3) the resources to become more self-directed with time, and 4) the setting in which learning takes place. Over the course of the relationship, the mentor helps develop the mentee’s self-direction from dependence to independence to interdependence (Zachary, 2000). As the relationship develops, a partnership evolves where mentor and mentee share the accountability and responsibility for achieving the mentee’s attainable and measurable learning goals. At any time during the mentoring relationship, mentor and mentee may assess, diagnose, plan, implement, and evaluate existing or new learning goals. The process is circular.

Our mentoring philosophy closely mirrors what we know about adult learning (Knowles, 1980). The elements of the learner-centered mentoring paradigm are illustrated in Chart 1. Elements of a Learner-Centered Mentoring Paradigm.

Chart 1. Elements of a Learner-Centered Mentoring Paradigm

Mentoring Element	Paradigm Shift	Adult Learning Principle
Mentee Role	Passive Recipient to Active Associate	The mentee learns best when involved in assessing, diagnosing, planning, implementing, and evaluating one's own learning
Mentor Role	Authoritarian to Facilitator	Mentor as catalyst creates and maintains supportive climate, promoting conditions necessary for mentee learning to take place
Learning Process	Focus on the Schedule to Focus on the Purpose of Goals	Process of learning increases when there exists a readiness focused on the specific need to know and attain defined goals
Mentoring Relationship	Single Lifetime Mentor-Mentee Association to Multiple Lifetime Mentor-Mentees & Multiple Types of Mentoring	The primary learning resource is life experiences, so that the life experiences of others add to the wealth of the learning process
Setting	Face-to-Face Interactions to Multiple Venues/Opportunities for Interaction (Internet/Social Media)	Adult learners tend to demonstrate need for immediate communication and feedback
Focus	Leaning Toward Product (Knowledge Transfer & Acquisition) to Leaning Toward Process (Critical Reflection & Application)	Adult learners tend to respond optimally to learning when the motivation to learn is internally driven

Adapted from Knowles (1980); Zachary (2000).

In reviewing the literature on mentoring, our learner-centered mentoring philosophy focuses on how the faculty member as mentor approaches the mentor-mentee relationship with adult students engaged in undergraduate research. As mentors, we strive to act in many supportive capacities. The supportive mentor capacities include but are not limited to the following: 1) act as sounding board for ideas and/or concerns about school and/or career choices, 2) give advice and guidance, share ideas, and provide feedback, 3) seek opportunities for increased visibility for mentees, 4) serve as advocate for mentees whenever opportunity presents

itself, 5) share information on "unwritten rules for success" within the school and/or organization, 6) provide insights into scholarship and/or job opportunities, 7) provide support on personal issues if appropriate, and, when appropriate, 8) play devil's advocate to help mentees think through important decisions and strategies.

Cross-Cultural Mentoring

Some people define diversity as any difference between two individuals: differences in background, education, ethnicity, physical attributes, race, sexual orientation, socioeconomics, race, and so on. Although this type of definition has the advantage of emphasizing that we're all unique, it also has the disadvantage of negating those differences that have had a disproportionate impact on a class of individuals, specifically in the areas of age, disability, gender, race, and sexual orientation. Given research has shown that people are more likely to mentor someone who looks like them rather than someone who is unlike them, one of the benefits of a mentoring program is that it can pair people who would not normally come together. In coming together, the mentors and mentees should be provided with training on cultural diversity and its context in mentoring to help ensure successful relationships. When viewing mentoring through the lenses of cultural awareness, we may gain an understanding of what mentoring is in a way in which these cross-cultural relationships will often be profoundly transforming for both partners.

Being an effective mentor involves being culturally aware. With awareness comes the ability to address and prevent stereotypes from affecting your mentoring success. The mentor should pay special attention to the following:

- Falling into a “surrogate parent” role, where the mentee expects to be nurtured instead of empowered to make choices. The mentor as parent provides more emotional support than appropriate. Sometimes, students run to their own parent for “rescuing” when things go wrong.
- “Benefactor versus Victim” can happen if the mentor is of the majority background and the mentee is not. This situation, which may be very difficult to discuss in our politically correct society, is essential to discuss, so that the mentor does not see the mentee as victim, and the mentee fails to engage in a self-fulfilling prophecy of identity threat.
- “Race doesn’t matter,” may sound as taking a politically correct stance. However, mentors and mentees need to appreciate the differences that race may bring to their relationships.
- Gender and sexual orientation may be issues. Again, assumptions must not be taken that only mentors and mentees of the same background will have successful mentoring relationships.
- It is very important that both mentor and mentee take diversity training and be able to address any diversity issue in a forthright manner. Not being able to discuss the issue is an indication that the mentor/mentee relationship may not be a sustainable or successful one.

Remember that with awareness comes the ability to address and prevent some of these stereotypes from affecting your mentoring success.

Communication is the essential building block for facilitating learning relationships and ensuring a successful cross-cultural mentoring experience. A mentoring relationship in a cross-cultural context requires preparation. There are many competencies for establishing successful partnerships, which may also pertain to mentoring relationships: becoming culturally attuned to other cultures; becoming culturally self-aware; developing a working knowledge of and appreciation for other cultures; and improving communication skills, such as considering issues of place, space, and time. The following Case Studies aim to cause self-reflection as to the critical importance of cross-cultural issues in mentoring.

Case Study 1.3 Parental Involvement

Nicole, a timid student with an excellent academic record, is in Professor Zimmer's class. Nervous and unsure, she approaches Professor Zimmer, and asks to conduct undergraduate research with him. Agreeing, Professor Zimmer develops an appropriate project, and shows Nicole how to use the instrumentation after review of safe laboratory procedures. Nicole does not appear to exhibit the level of care in the lab that Professor Zimmer expects. More glassware than usual has been broken. On two occasions Nicole forgot to filter the sample, requiring Professor Zimmer to disassemble and clean the instrument, taking several hours. Professor Zimmer finds himself getting angry but controls his temper. He then reminds Nicole of the importance of exercising care and following protocols in the lab. Professor Zimmer adds that Nicole will be unable to continue the project if the situation does not improve. Nicole nods and seems to understand but does not say anything. An hour later, Professor Zimmer returns to his office and listens to his messages. The student's father has called, sounds irate, and wants to meet with him. Professor Zimmer sits at his desk, wondering what to do next.

Reflection: What cross-cultural approaches to communication and consideration did Professor Zimmer miss? Where could Professor Zimmer have spent more time with the relationship he established with Nicole? What steps could he have taken to try to learn more about his mentee?

Case Study 1.4: Two Different Approaches

Professor Ex serves as a mentor for two undergraduate students, Shaba James and Jake Wall. Shaba is a minority first-generation college student educated in the Caribbean. Jake is a white student educated in the United States. Professor Ex has mentored only two male minority students in five years at the college, but accepts Shaba because she was in a research program aimed at supporting minority students, and at the insistence of a colleague. Jake and Shaba are both driven students and can independently obtain literature information about the research and protocols necessary for the project. Nevertheless, both have made only minor progress towards completion of the project. Shaba makes an appointment with Professor Ex, and gently tells him

that she feels alienated because he holds more office meetings with Jake and spends more time helping him. Professor Ex explains that the expectations for Jake are higher. Professor Ex states that Shaba and Jake are mentored differently, because Shaba does not intend to continue her education but instead find a job after graduating. However, since Jake will go to graduate school, Professor Ex believes more time and effort must be invested in Jake to develop his research skills. Shaba tells Professor Ex that she actually wants to become a professor, and go on for a post-doctorate experience. Professor Ex seems shocked. Shaba feels there is another reason for the alienation based on Professor Ex's mentoring history. She decides to abandon the project.

Reflection: How do you feel about the possibility that the underlying cause of Professor Ex's treatment of Shaba may be due to "hidden" racism? Can you explain some justifiable reasons to believe that Shaba is a victim of "hidden" racism?

How does an effective mentor check his or her behavior before engaging in any communication with a mentee of a different background? Perhaps taking a self-inventory can help, as with the following checklist (Morrison et al.; Zachary, 2000).

Checklist 1.1 Intercultural Communication Checklist

Use this checklist as self-inventory in a cross-cultural mentoring relationship.

1. Prepare to:

- _____ explore what your own culture means to you.
- _____ explore the mentee's culture prior to meeting each other.
- _____ reflect upon what it is you want from the mentoring relationship.
- _____ clarify the mutual expectations and goals of the mentoring relationship.

2. Remember to:

- _____ ask questions about culture if you need clarification.
- _____ suspend bias and judgment, and accept cultural differences.
- _____ consistently show attention, empathy, interest, patience, and respect.
- _____ learn about differences in communication space, gestures, inflection, learning pace, time, and use of silence.
- _____ ask for feedback with descriptive questions (who, what, when, where, why, how, how many, how much?).
- _____ express the need to think about something within a reasonable time period so that exploration and self-reflection may take place.

3. Remember to observe:

- _____ your own assumptions, biases, identity-threats, and stereotypes.
- _____ any potential or present discomfort, disconnect, or other warning feelings.
- _____ any contrasts and values that may be present and operating in the relationship.
- _____ consistency and relevance in keeping appointments, providing feedback and providing responses.

The Diversity of City Tech

The rationale of this subsection is to provide a rich context into which City Tech and mentoring at the institution can be situated. The presentation of the city as a fecund educational resource for its inhabitants, is a significant part of justifying City Tech's participation in mentorship-based activities. Describing the diversity of New York City is a broad undertaking; not only because of the city's unique attributes, but the term of "diversity" itself can assume several connotations. Perhaps a tractable way of framing this complexity is to describe the following aspects of the diversity of our own institution.

New York City College of Technology (City Tech) of The City University of New York (CUNY) is the largest public senior-level college of technology in New York State. As a national model for technological education, The Middle States Commission on Higher Education accredits the College. For last five years City Tech has been among the leaders in the diversity of the students it serves in the annual survey by U.S. News & World Report on Comprehensive Colleges/Bachelor's (North). The U.S. News survey also lists the City Tech among leaders in new student retention in colleges of its type. City Tech also ranks at or near the top of all colleges in the nation in the number of African American, Asian American and Hispanic students enrolled in associate degree programs in the engineering technologies. City Tech is designated as both a Hispanic- Serving-Institution, as well as a Minority-Serving-Institution for its student body diversity.

The City Tech student body is incredibly diverse. Based on the 2010 City University of New York Student Experience Survey, approximately 40% of the student body reported being born outside of United States (US), with 134 countries represented, and speaking more than 85 languages; 61.6% reported a language other than English spoken at home. In terms of race/ethnicity, students self-reported the following: 32.5% Black (non-Hispanic), 33.2% Hispanic, 19.2% Asian/Pacific Islander, 11.2% White (non-Hispanic), 0.5% Native American, while 3.4% reported other as race/ethnicity. With regard to place of residence, 50.8% lived in Brooklyn, 1.8% in other parts of New York State, 24.2% called the borough of Queens home, 10.0% lived in the Bronx, 2.3% lived in Staten Island, .4% Other US, 9.1% lived in Manhattan, while 1.4% reported International as place of residence. In terms of socioeconomic challenges, more than one-half (56%) of our students reported household income less than \$30,000; 76.8%

of incoming freshmen received need-based financial aid, 60% of continuing students received need-based aid, and 23% of students worked more than 20 hours per week. Only 33% of students reported their parents as college graduates.

During the academic 2011-2012 year, the College reported that there were approximately 400 full-time faculty members, and 850 part-time faculty members. City Tech's outstanding faculty – many recruited from business, industry and the professions and most holding the highest academic and practice degrees - provide students with the benefit of their extensive knowledge and real-world experience in the following Schools: School of Technology & Design (43.1%), School of Professional Studies (42.6%), and School of Arts & Sciences (14.3%). Alumni totaled more than 85,600. On an annual basis, City Tech serves more than 32,000 degree, certificate and continuing education students. Enrollments have grown significantly and steadily in recent years, such that for fall 2011, there were 15,963 students enrolled (65% full-time, 35% part-time), with 31.2% (4,986) in baccalaureate degree programs.

The diversity in faculty expertise is likewise demonstrated in the academic areas in which faculty members facilitate the education of students. The academic programs offered by the School of Technology & Design include: Advertising Design & Graphic Arts, Architectural Technology, Computer Engineering Technology, Computer Systems Technology, Construction Management & Civil Engineering Technology, Electrical Engineering Technology, Entertainment Technology, Environmental Control Technology, and Mechanical Engineering Technology. Academic programs within the School of Professional Studies include: Business, Career & Technology Teacher Education, Dental Hygiene, Health Services Administration, Hospitality Management, Human Services, Law & Paralegal Studies, Nursing, Radiologic Technology & Medical Imaging, Restorative Dentistry, and Vision Care Technology. Programs of study within the School of Arts & Sciences include: Chemical Technology, Liberal Arts & Sciences, and Mathematics. The College also offers 16 credit-bearing certificate programs in a broad range of subjects, to allow specialized work of limited duration. The Department of Continuing Education serves approximately 16,000 non-degree students (academic year 2010-11).

The Need For Undergraduate Research Mentoring At City Tech

The need for undergraduate research mentoring comes from institutional self-assessments that demonstrate student need. Our desire as faculty and community members is to increase the rates of enrollment, retention & completion of degree programs, particularly in light of the underrepresentation of students of minority backgrounds enrolled in research-related disciplines, such as the fields of study in the categories of science, technology, engineering and mathematics (STEM).

Projected Impacts of Mentoring Activities at City Tech

Anticipated student outcomes owed to dedicated mentoring include the following: increased rates of enrollment, student persistence in pursuing research and their studies in

successful manners, and degree completion. In addition, the hope is that clear and expanded career pathways become salient for our students.

Sources of Research Funding For Students

As a Committee, we seek out current extramural sources of undergraduate research funding that exist for our undergraduate students. Please see table attached in the Appendix for some examples. The table is not all-inclusive, as sources do change.

As a Committee, we also provide intra-institutional sources of opportunity for research engagement and growth for our undergraduate students. For example, we have established the Honors Scholars Program, and the Emerging Scholars Program. A full description of each Program follows.

HONORS SCHOLARS: Program Description

Honors Scholars Program

Location: Midway Building Room 308

Phone: 718.254.8668

E-mail: Prof. Janet Liou-Mark: jliou-mark@citytech.cuny.edu

Prof. Reneta Lansiquot: rlansiquot@citytech.cuny.edu

Ms. Laura Yuen-Lau: lyuen-lau@citytech.cuny.edu

Website: <http://cue.citytech.cuny.edu/honorsscholars>

The Honors Scholars Program at New York City College of Technology is dedicated to providing academically gifted students with the opportunity to develop their intellectual potential. The Program is open to students who have completed at least 16 credits with a cumulative grade-point-average of 3.4 or better. Transfer students entering New York City College of Technology with 16 or more college credit hours and a transfer grade-point average of 3.4 or higher are eligible to apply.

The Honors Scholars Program encourages students who have demonstrated high academic achievement to undertake honors-level work in any appropriate course through the Contract for Honors Credit in a Regular Course agreement. Honors work normally involves substantial independent research projects in addition to the normal requirements of the course. Specific expectations for contract honors credit must be negotiated between the student and professor and approved by both the department chairperson and the Honors Scholars Program Director. Honors credit is noted on the transcript as “HONORS PROJECT” followed by the course and semester.

The Contract for Honors Credit in a Regular Course should be completed and signed by the student and professor. The original contract needs to be submitted six weeks after the first

day of class to the Honors Scholars office (Midway 308). Copies should be retained by both professor and student to avoid any misunderstanding about the expectations for Honors credit. Upon completion of the course, the professor should report satisfactory performance of this contract, with a grade of B or better, to the Honors Scholars Program Director in order for Honors credit to be placed on the student's transcript.

Students who complete a Contract for Honors Credit in a Regular Course are required to participate in four required undergraduate research workshops and the Honors Scholars Poster Presentation. The workshops will assist students in the following areas:

- Writing Abstracts for Research Projects
- Advancing Library Research Techniques
- Developing and Delivering Effective Research Presentations
- Designing a Research Poster Presentation

A copy of the research project at the end of the semester must be submitted to the Honors Scholars office. Please consult the Calendar of Events for the dates of the workshops and poster presentation.

Emerging Scholars Program

The Emerging Scholars Program provides a stipend for a student researcher assisting a faculty member with research or other scholarly endeavors. The purpose of the Program is to help students develop a close relationship with a faculty member and promote a practical understanding of material learned in courses, while providing the faculty member as mentor with some assistance. In order to be awarded the stipend, students are expected to:

- Attend an organizational meeting
- Work a few hours every week (~50 hours total) with their mentor*
- Attend the workshop on Writing Abstracts for Research Projects.
- Attend the workshop on Advance Research Techniques.
- Attend the workshop on Developing and Delivering Effective Research Presentation.
- Attend the workshop on Designing a Research Poster Presentations.
- Participate in the Honor-Scholars poster session at the end of the semester as well as the Awards Ceremony.
- Prepare abstract summarizing accomplishments and submit it to the mentor by specified date. Students will be asked permission to publish their abstract on the college website and in the book of abstracts.
- Be a full-time student in good academic standing (exceptional PT students are eligible for 50% stipends for 25 hours of work with their mentors).

* Due to restrictions in funding, students must be US residents or permanent resident aliens (they must have a social security number) to receive the stipend. They must be recommended by a faculty member into the program, and be in good academic standing. In rare cases advanced part-time students are accepted into the program. Partial stipends may also be arranged for part-time

students. They participate a proportional number of hours, typically a stipend for 25 hours of work and must attend the workshops.

In order to be paid, a W-9 form must be completed and submitted to the Dean of Arts and Sciences. Stipends are sent to the home of the student approximately 6- 8 weeks after the end of the semester. To insure timely delivery, please verify that the college has the students' correct address on file. At the Awards ceremony, students and mentors will receive a certificate of accomplishments for a copy of the book of abstracts.

City Tech also provides a Research Mixer event for faculty and students who participate in the Emerging and Honors Scholars research poster session. A description of that event follows:

Research Mixer

The Research Mixer is an event for students and faculty to identify common research interests and network. Held concurrently with the Emerging and Honors Scholar poster session, it provides an opportunity for undergraduate students to be introduced to research programs and specific research projects by City Tech faculty.

During the two hour mixer, faculty from the Undergraduate Research Committee, who briefly introduce their research interests, greets students. The 'scavenger hunt' is a complex game that gives students the opportunity to seek and find research projects held that current semester. The 'wandering scholars' segment allows student to mingle and network with faculty. Students are encouraged to exchange contact information with others. Mentors' brochure, summer research opportunities, internships and scholarships information are also provided. Awards and prizes presentations conclude the research mixer event.

The Dean of Arts and Sciences and the Undergraduate Research Office sponsor the Research Mixer event.

The next section of the Handbook focuses on laying the foundation for our mentoring journey. It begins with a brief overview of mentoring, and includes exercises and self-reflection to help us as mentors, and our mentees to establish a climate conducive to learning. As mentors, we must involve ourselves in planning how and what will be learned. We need to encourage identification and use of a variety of resources and approaches to accomplish our objectives. Most importantly, we must help ourselves implement and evaluate how we facilitate the learning of the process of undergraduate research on our journey with our mentees.