

## **GlobalCUNY: The NYC Louis Stokes Alliance Model for International Research Experiences for Minority Students**

### **Dr. Claude Brathwaite, City College of the City University of New York**

Dr. Claude Brathwaite is currently the Director of Student Resources and Services at the Grove School of Engineering. He served as the Executive Director for the New York City Louis Stokes Alliance for Minority Participation in Science, Technology, Engineering and Mathematics (LSAMP). Claude initially attended Hostos Community College and later received his BS in Chemistry from the City College of the City University of New York and his Ph.D. in Organic Chemistry from the Graduate Center of the City University of New York. He was a Chancellor's Fellow (City University of New York) and a NIH Postdoctoral Fellow (Weill Cornell Medical College-Division of Molecular Medicine). As the Executive Director of the LSAMP, he was responsible for the day-to-day operation of the NYC Louis Stokes Alliance program across the 18 member campuses of City University of New York. Claude also served as the Co-Director of the Black Studies Program at the City College and the Project Director of the City College Black Male Leadership and Mentoring Program. The Black Male Leadership and Mentoring Project (BMLMP) at the City College of New York, provides a support system during the critical stages of academic and career development.

### **Dr. Julianne Vernon, Vanderbilt University**

Dean Vernon works in the field of STEM educational research; some areas of focus include student retention and implementation of innovative pedagogy and technology. She is currently the Dean of Academic programs overseeing the First Year Courses, Study Abroad Programs, and International Initiatives at Vanderbilt University. She is also the executive director of a NSF INCLUDES grant, SCI-STEPS. The mission is to increase the retention of underrepresented groups in the physical sciences and engineering from college to PhD and ultimately the workforce. She received her Bachelors in Chemical Engineering from the City College of New York and her Doctorate degree at University of Florida in Environmental Engineering. She has over 8 years of experience developing international and national research experiences for STEM majors, as well as project management.

## **GlobalCUNY: The NYC Louis Stokes Alliance model for High Impact International Research Experiences 2007 to 2018**

### **ABSTRACT**

The NYC Louis Stokes Alliance (NYC LSAMP) at the City University of New York (CUNY) has, since its inception in November 1992, been at the forefront of a concentrated effort to substantially increase the number of underrepresented minority students who pursue, and graduate with Baccalaureate Degrees in Science, Technology, Engineering and Mathematics (STEM). Since its inception in November 1992, over 17,500 baccalaureate degrees have been awarded to underrepresented minority students at CUNY. International Research (IR) experiences are increasingly seen as important components of the High Impact undergraduate activities that lead to graduation, and continuation to graduate study.

This paper will emphasize 1) how elements of the approach integrate into the NYC LSAMP program operations, 2) the university sites research facilities/activities 3) participant recruitment, 4) pre-departure activities and 5) models for campus wide participation. The partnerships were formed over a ten year span with the first cohort of students participating in Sweden at KTH in 2008, followed by Colombia in 2009, Austria in 2010, the Netherlands in 2011, Brazil in 2013, Morocco in 2015, China in 2017 and Japan in 2018. Students have conducted research in the areas of Material Science, Economics, Water Quality, Environmental Science, Public Health, Biodiversity, Neuroscience, Transportation, Biochemistry, Chemistry, Civil Engineering, Chemical Engineering, Electrical Engineering and Ethno-Botany. Participants from other Alliances include the Greater Philadelphia Louis Stokes Alliance, the Puerto Rico Louis Stokes Alliance, the Florida-Georgia Louis Stokes Alliance, the SUNY Louis Stokes Alliance and the California State Louis Stokes Alliance, all of which have some developed program activities in IR.

### **KEYWORDS**

Underrepresented Minorities, International Research, High Impact, International Partnerships

## **INTRODUCTION - U.S. STUDENTS STUDYING ABROAD**

The Open Doors report published by the Institute of International Education, the leading not-for-profit educational and cultural exchange organization in the United States has shown that over the last decade, a 58% increase in the number of US studying abroad and only a 12% increase in the number of minorities studying abroad in the same period. Similarly over the same period, STEM majors going abroad showed an increase of 9%. All minority students and STEM students accounted for 28% and 25% respectively, in 2015/2016 [1]. The importance and benefits of STEM students having an international experience has been well documented [2,3]. Additionally, higher education is moving forward with embracing the concept of educating engineers as a global citizen [4].

## **OVERVIEW: INTERNATIONAL RESEARCH (IR)**

The NYC LSAMP committed to integrating international activities into program activities, and officially launched the activity in 2008 at the Annual Urban University Conference Series, with the theme of Explorations and Discovery. This was followed with the *Fall Explorers Reception* in 2009, honoring students who participated in IR and at the *Bridge to the Doctorate Retreats*. The collaborations with 1) existing programs within the NSF and other federal agencies, 2) a core of mentors/faculty who have collaborations, 3) Study Abroad Offices, Departments, Institutes and Centers, and 4) other Louis Stokes Alliance programs, have made IR opportunities a reality for many students. In 2014, the Annual GlobalCUNY Conference was inaugurated and is held during the International Studies Week. It serves as a Research Colloquium and Expo, focused on highlighting projects and programs underway across the university, which have an international focus, and allows for the active participation/inclusion of STEM students [5]. NYC LSAMP Scholars in the last ten years participated in research experiences in England, Sweden, Poland, Scotland, Spain, Italy, Germany, Austria, France, the Netherlands, Japan, China, Singapore, Australia, Vietnam, Sri Lanka, Honduras, Colombia, Costa Rica, Ecuador, Mexico, Brazil, Jamaica, Dominican Republic, St. Kitts, Ethiopia, Togo, Ghana, South Africa and Morocco [6].

## **IR SITE PROGRAMS**

A summary of research sites with universities can be seen in Table 1, below. Previous publications on IR for underrepresented minority students in Sweden, the Netherlands, and Austria provide a detail description of the university sites research facilities and activities [5,6]. In the last six years, 25 students were hosted at TU Graz/U Graz and 12 were the recipients of the Marshall Plan scholarship. From 2008 to present, 32 students have participated in research at KTH in Sweden. In the Netherlands, from 2010-2015, 17 students were hosted at the Maastricht University. Additionally, the program model used to implement the Cartagena, Colombia project produced a total of 26 Louis Stokes Alliance scholars (six cohorts), along with 24 Colombian students since 2009 [7]. During the period, a total of seventy-four (74) students participated from 2008 to 2018 in programs based in Sweden, the Netherlands and Austria, fifty-two (52) in the Colombia based programs, twenty-five (25) in Brazil based programs and over twenty (20) in Morocco.

Toyohashi, Japan - At Toyohashi University of Technology (TUT) research projects for students include areas such as Chemistry, Mechanical Engineering, Computer Science, Biomedical Science/Engineering, Material Science and Nanotechnology. Five (5) students participated in the inaugural group in 2018. The summer program also provide cultural experience for the participating students.

Beijing, China - A recently developed partnership with the departments/faculty at Beijing University of Chemical Technology (BUCT) for selected students to develop and/or work on existing STEM research projects. The summer program also provides cultural experience for the participating students. The program includes 4 to 6 students each summer. The areas of research are within the Chemical Sciences focusing on Environmental, Biomedical Science/Engineering, Biochemistry, Material Science and Nanotechnology, Catalysis and Synthesis. Our first cohort of 4 students conducted research in 2017 and 3 in 2018. It should be noted that only China is in the top 20 destinations of US students studying abroad in 2015/2016 [1].

Cali, Colombia - CINARA is a research and development institution based at the Faculty of Engineering at Universidad del Valle in Cali, Colombia. The institute is widely recognized within the water supply and environmental sanitation sector in Colombia, as well as in other Latin America countries, mainly from the Andean and Central America regions. Scholars in 2012 and 2013 focused on research being conducted by CINARA. In 2015, 2016, and 2017, other projects included Civil Engineering (Structures and Transportation), Electrical Engineering, Economics, Chemistry/Biochemistry (synthesis and spectroscopy), Sustainable Development, Entomology and Public Health with CISCALVA, an institute focused on Public Health. A total of 20 students have participated (six cohorts) have participated since 2012.

Bahia, Brazil - Partners include the Philadelphia Louis Stokes Alliance program, the State University of Feira de Santana (UEFS) and the Federal University of the Recôncavo Baiano (UFRB). The summer research activities included language instruction, fieldwork and laboratory work, participating in ongoing projects involving microbiology (fungi), environmental monitoring of heavy metals and water quality, molecular biology, biodiversity and transportation. A total of 25 students have participated since inception in 2013 at UEFS.

Casablanca/ Meknes, Morocco - The NYC Louis Stokes Alliance /CSTEP-Moroccan research initiative give students the opportunity to conduct research in Morocco. At the Agropole of Mekness, students engage in Ethno-botany research, a study that involves the isolation and characterization of novel compounds from indigenous plants in Morocco. At Shiekh Khalifa hospital in Casablanca, students perform research in cytogenetics and cancer research. Over 50 students have participated in the program, 2015 to 2018 (20 of them NYC LSAMP Scholars).

Table 1. LSAMP IR Sites Summary

<b>Abbreviation</b>	<b>International University/Organization</b>	<b>Location</b>
UGraz	University of Graz	Graz, Austria
TUGraz	Technical University of Graz	Graz, Austria
USB	Universidad de San Buenaventura	Cartagena, Colombia
UC	University of Cartagena	Cartagena, Colombia
UEFS	State University of Feira de Santana	Feira de Santana-

		Bahia, Brazil
UFRB	Federal University of the Recôncavo Baiano	Cruz das Almas-Bahia, Brazil
UValle	Universidad del Valle, Cali	Cali, Colombia
NIMA	National Institute of Medicinal and Aromatic Plants, Morocco	Mekness, Taounate Province, Morocco
	Royal Institute of Technology (KTH)	Stockholm, Sweden
MU	Maastricht University,	Maastricht, the Netherlands
BUCT	Beijing University of Chemical Technology	Beijing, China
TUT	Toyohashi University of Technology	Toyohashi, Japan

## PROGRAM MODELS

Study abroad courses that are faculty led and short term are seen as one of the major vehicles for students to integrate an international experience in their curriculum. The opposite is true for the NYC LSAMP model, which consists of 8 weeks or more of research. A summary of the program elements at each university site is shown in Table 2. The eleven core elements of the program all contribute to the success of the programming per each site.

A total of nine site coordinators for the Netherlands (1), China (1), Morocco (1) and Colombia (6) sites were engaged, all were participants in the NYC LSAMP, and need not have fluency in the language of the host country. Only for the program in Cartagena that involved the management of both Colombian and American students, was language fluency in Spanish and English mandated. All site coordinators were graduate students, or in one case a recent Doctoral graduate. Three site coordinators have completed Doctoral degrees, one is currently pursuing a doctoral degree and three are now looking towards pursuing a doctoral degree.

Site Coordinator – In general, the site coordinator serves as the liaison, senior program representative, and in some cases researcher. A bi-lingual site coordinator is essential for the Colombia sites as there is no language requirement (speaking Spanish) for the NYC LSAMP participants. The project in Cartagena (Colombia) involves supervision of ten to fifteen students (American and Colombian), where coordinating the logistics for field sampling, laboratory supervision, liaising with the university administrators and the NGO are all duties of the site coordinator.

International Office - An International Office (or similar entity) is the primary point of contact for the NYC LSAMP and the collaborating universities to ensure compliance with university policies and securing visas when necessary. The International Office also assists in securing housing, outreach to participating research faculty, and the university community.

Funding - A majority of the participants (US) are funded by the NSF, as the participants were LSAMP Level I students, BTD students, IRES students. Other students are supported by campus based scholarships.

Students Exchange - Exchange agreements were required for some programs but not all. Exchange programs in most cases are reciprocal, promoting mobility by the international students to CUNY. In some cases, not having an agreement in place did not inhibit the programming. For the programming in KTH and TU-Graz/Uni Graz, the reciprocal

programming consisted of summer exchange by KTH students conducting research, and Graz students participating in a two-week summer seminar course, respectively.

Language Program - At UEFS (Brazil) the Language program was created to assist the LSAMP Scholars with increasing their abilities to communicate in Portuguese during their stay in Brazil, as well as facilitating greater cultural integration during the summer stay.

Academic level - Participants are all undergraduate or graduate students with participation from community college students at CUNY. In the case of Maastricht University (the Netherlands), the site coordinator was a doctoral student who served as the coordinator as well as research participant on a collaborative project between faculties in both universities. This ensured continuity of the project, and logistics as the university International Office was not engaged in the process.

Table 2: Program Elements at IR Site

Program Elements	KTH	MU	TU/U Graz	UValle	UC	Morocco	BUCT	UEFS/UF RB	TUT
Site Coordinator		x		x	x	x	x		
CUNY Faculty Led	x		x						
International Office	x		x	x			x	x	x
Reciprocal Program	x		x						x
Laboratory Bench Fee		x			x				
University Support	x				x				
Student Exchange Agreement	x		x						x
NSF Support	x	x	x	x	x	x	x	x	x
Fellowship funding		x	x						
Undergraduate participation	x	x	x	x	x	x	x	x	x
Community College participation				x	x	x			
Graduate participation	x	x	x	x	x	x	x		
Language Program								x	

## **PARTICIPANT RECRUITMENT AND PRE-DEPARTURE ACTIVITIES**

The NYC LSAMP Executive Director employs a recruitment strategy that focuses on reviewing yearly academic and research performance. As the NYC LSAMP focuses on substantially increasing the number of underrepresented minorities in the STEM disciplines, recruitment of both male and female research scholars is conducted. An IR Interest form is distributed across CUNY and integrated into the GlobalCUNY.org platform. Student recruitment and selection are ongoing year round, and officially begin at the annual GlobalCUNY conference, which is held annually during International Studies Week. Campuses at CUNY organize a number of activities related to study abroad and these events are targeted to provide information to students on the IR opportunities.

## **SCHOLAR RECRUITMENT**

September - December: Students perform research at their home campus. The research projects and techniques employed in their laboratories may or may not be related to the research themes in the labs at the IR site. The selection of students will be partially based on their prior research experience and laboratory experience in areas related to the IR site. In addition, weekly research meetings where students present their research findings are also utilized for promotion of IR, gauging the student's interest in participating, and the relevance of the research work to under study to the research at the IR site.

November: Students with an interest in participating are required to complete an IR Interest form, (available online and requests a short biography and the reason/expectations for participating in the IR program), and are invited to participate in the Annual GlobalCUNY Conference, inaugurated in 2014 and is held during the International Studies Week. It serves as a Research Colloquium and Expo, focused on highlighting projects and programs underway across the university, which have an international focus, and allows for the active participation/inclusion of STEM students.

January: Mentor approved research reports for the fall semester are reviewed by the LSAMP Executive Director and the students are evaluated independently during the end-of-semester meeting. CUNY students are required to submit a resume, a biography, updated academic transcript, and statement on participating in IR. This is in addition to the Research Interest Form they would have submitted leading up to the GlobalCUNY conference in November.

## **SCHOLAR SELECTION**

Both undergraduate and graduate students are selected by the NYC LSAMP Executive Director in collaboration, with the site coordinator, former student participant, NYC LSAMP faculty and a Post Doctoral Associate (attached to the NYC LSAMP office).

## **PRE-DEPARTURE PREPARATION**

Four pre-departure meetings are held for students selected to participate in the IR. A total of 20 hours will serve to prepare students for the IR experience, educate students on the host institution, research, as well as operations. Topics to be covered included: required program documents, departure/return dates, research projects, weekly reports, Skype meetings, housing and travel, ticket purchases, housing payment process, visas, administrative/program structure, international office at host site, communication, banking and currency, health insurance, emergency procedures and presentations/discussions with previous IR program participants.

Meeting #1 (1<sup>st</sup> week of March): IR Scholars selected meet and are introduced. The exchange of contact information takes place for each international destination. The students are educated on the history of the program and what it entails to participate. Scholars are given the program guidelines, safety in a foreign country presentation, and information about the culture of

the country. Students are informed about the academic and research expectation of the program. They receive a schedule outlining their research program and the expectations and deadline of the final report. Other details on the host institution are distributed including travel arrangements, visa and insurance requirements.

Meeting #2 (1<sup>st</sup> week of April): IR program alums are available to answer any questions that the new IR scholars may have. This session focuses on life away from home. Alums provide vast knowledge on living costs, housing and food, cell phone plans and cultural events during the summer. The alums provide their contact information, so that the scholars are able to communicate with them if needed when they are abroad.

Meeting #3 (1<sup>st</sup> week of May): Preparations for Travel –Leading up to the month of May, students should have received all the documents needed for travel. US citizens/permanent residents may or may not be required to obtain a visa depending on country of origin. This meeting is scheduled to ensure that all documentations are in place or that students are in the process of applying for the visa and all ticket purchases are complete.

Meeting #4 (4th week of May): Ready for departure – This last week is used to iron out any last minute questions and concerns, changes that may be made, bring alternates up to speed, restate and confirm the safety, departure/return dates, insurance verifications, research projects, weekly reports, housing, and ticket purchases (alterations, in –country arrivals) and local transportation.

## **STUDENT OUTCOMES**

Some major differences are revealed in the outcomes for the students going to Europe (three main sites of Stockholm, Graz, Maastricht) and Latin America (two main sites Brazil and Colombia). The two sites account for over 75% of the NYC LSAMP Scholars participating, and are an excellent contrast of science research facilities and development, with programs in Latin America costing about 50% of the European sites (approximately \$5000 versus \$10,000). In comparison to the Study Abroad participation outlined in the Open Doors report, the LSAMP scholars at both locations (Europe and Latin America) are 100% underrepresented minorities and STEM majors versus 28.4 % and 25.2% STEM respectively. In addition, there is no real gender difference seen in the NYC LSAMP Scholar community, while nationally 66% of the participants are female. Participation at the graduate level is at 29% overall (skewed by Europe site participation) and is 2.4 times the participation nationally for graduate students. Participation in the Latin America programming by community college students is at 25%, (no community college NYC LSAMP participants were selected for Europe), and is twice that of the Study Abroad for sophomores and associate program participants at 13% and 2% [1]. There is a clear diversity in the STEM majors of the students participating in the Latin America programming, as the research topic areas are not as specific as two of the European sites (KTH and MU). The specialization of the Maastricht University site in the Neuroscience has resulted in eight peer-reviewed publications [8-16]. This exceeds all other sites and is attributed to the large percent of BTD scholars who participated and advanced undergraduates with an interest in the Neurosciences (biological sciences).

## **DISCUSSION: MODEL FOR CUNY-WIDE PARTICIPATION**

A survey of the study abroad offerings at the university reveals a dearth of opportunities centered in the STEM discipline, and the offerings are limited to short term offerings (two to three weeks) of which research is not the main course activity. Across the university (18 campuses) there is in existence 243 individual course listings for internships/independent study/research. For example, at CUNY, 36 of the 37 course listings that can be utilized for independent research/internships are in the STEM disciplines and can be utilized by students to engage in research at an IR site. CUNY is also the only unit at the university that is a member of the GlobalE3 organization. A survey of NYC LSAMP faculty (48 respondents of a CUNY-wide network of 400 faculty) revealed that 66% maintained international collaborations and 40% conducted research outside of the US in the past six years. In addition 71% of the respondents would like to develop future IR opportunities and, equally, 71% would host an international student or faculty in their research group. Of the respondents, 27% received a degree from a foreign institution.

GlobalCUNY was envisioned as a combination of a Research Colloquium and Expo, highlighting projects and programs underway across the university that have an international focus, and allows for the active participation/inclusion of STEM students. It was envisioned as a platform for collaborations, partnership development, and leveraging of university resources and expertise. The center focuses on funding/fellowships, which is seen as a major barrier to participation in a study abroad/IR experience by many students. GlobalCUNY offers students the opportunity to have formal as well as informal conversations with study abroad/IR participants and program managers throughout the day via oral and poster presentations, panel discussions and workshops.

Utilizing the already established GlobalCUNY platform, opportunities exist to 1) work collaboratively with the Study Abroad/IR Offices at CUNY to recruit 2000 students to the GlobalCUNY platform membership, 2) provide focused informational and workshop support on study abroad to CUNY students, 3) increase the number of faculty led study abroad offerings in STEM, 4) Build on the modest success of the NYC LSAMP in integrating an IR Experience into STEM training, and 5) increase the number of CUNY students participating in study abroad before graduation from CUNY.

## **FUTURE WORK**

We hope to continue our work and expand the number of IR sites that NYC LSAMP students can participate in. It is well documented the need to increase students global and cultural awareness to sustain a diverse environment and workforce. In addition, we hope to initiate work on creating a survey of questions to look at the students' perception of what an international opportunity can do for them. There are a number of different tools available but the broad range of the surveys collect data about the program. We hope to utilize our diverse population of students to pool what benefits and outcomes do students want from an international experience. In conjunction with surveying faculty/research advisors on what expectations they have for students conducting research in the IR program. We hope to be able to survey students when

they are professionals to see if any correlation between their international experience and their work/life experience occurred.

## ACKNOWLEDGEMENTS

We acknowledge the support of the faculty and staff of the City University of New York in supporting the NYC Louis Stokes Alliance activities, and the faculty, International Offices, and students at the participating universities in Latin America and Europe. We acknowledge the funding support of the NSF to the City University of New York NYC Louis Stokes Alliance, and the NSF-IRES program, and the Marshall Scholarship Program for funding this collaborative endeavor.

## REFERENCES

1. Institute of International Education. "Fields of Study of U.S. Study Abroad Students, 2000/01-2014/16." Open Doors Report on International Educational Exchange, (2017).
2. Institute of International Education. "Fields of Study of U.S. Study Abroad Students, 2000/01-2010/11." Open Doors Report on International Educational Exchange, (2012).
3. National Academy of Engineering. "The Engineer of 2020: Visions of Engineering in the New Century", 35 (2004).
4. Grandin, John M., and E. Dan Hirleman. "Educating engineers as global citizens: A call for action/A report of the national summit meeting on the globalization of engineering education." Online Journal for Global Engineering Education 4.1 (2009): 1.
5. New York City Louis Stokes Alliance Impact Report 1992-2015 (2012 and 2015).
6. Vernon, Julieanne., and Brathwaite, Claude., "Authentic International Research Experience: Program Model in Cartagena, Colombia" in the Proceedings of the 2016 ASEE Annual Conference, Paper ID # 15025, New Orleans, June, 2016.
7. Vernon, Julieanne., and Brathwaite, Claude., "An Approach Towards the Integration of International Research Experiences for Underrepresented Students in Sweden, the Netherlands, and Austria" in the Proceedings of the 2017 ASEE Annual Conference, Paper ID #18264, Columbus, June, 2017.
8. Andrade, P., Hoogland, G., Garcia, M. A., Steinbusch, H. W., Daemen, M. A., & Visser-Vandewalle, V. (2013). Elevated IL-1 $\beta$  and IL-6 levels in lumbar herniated discs in patients with sciatic pain. *European Spine Journal*, 22(4), 714-720.
9. Andrade, P., Visser-Vandewalle, V., Del Rosario, J. S., Daemen, M. A., Buurman, W. A., Steinbusch, H. W., & Hoogland, G. (2012). The thalidomide analgesic effect is associated with differential TNF- $\alpha$  receptor expression in the dorsal horn of the spinal cord as studied in a rat model of neuropathic pain. *Brain Research*, 1450, 24-32.
10. Andrade, P., Hoogland, G., Del Rosario, J. S., Steinbusch, H. W., Visser-Vandewalle, V., & Daemen, M. A. (2014). Tumor necrosis factor- $\alpha$  inhibitors alleviation of e-experimentally induced neuropathic pain is associated with modulation of TNF receptor expression. *Journal of Neuroscience Research*, 92 (11), 1490-1498.

11. Cruz, J. D., Schmidt-Kastner, R., Stevens, J. A. A., Steinbusch, H. W. M., & Rutten, B. P. F. (2014). Differential distribution of hypoxia-inducible factor 1-beta (ARNT or ARNT2) in mouse substantia nigra and ventral tegmental area. *Journal of Chemical Neuroanatomy*, 61, 64-71.
12. Cruz, J. D., Heschem, S., Adriaanse, B., Campos, F. L., Steinbusch, H. W. M., Rutten, B. P. F., ... & Jahanshahi, A. (2015). Increased number of TH-immunoreactive cells in the ventral tegmental area after deep brain stimulation of the anterior nucleus of the thalamus. *Brain Structure and Function*, 220(5), 3061-3066.
13. Chouliaras, L., Van den Hove, D. L. A., Kenis, G., Cruz, J. D., Lemmens, M. A. M., Van Os, J., ... & Rutten, B. P. F. (2011). Caloric restriction attenuates age-related changes of DNA methyltransferase 3a in mouse hippocampus. *Brain, behavior, and immunity*, 25(4), 616-623.
14. Chouliaras, L., Van den Hove, D. L. A., Kenis, G., Cruz, J. D., Lemmens, M. A. M., Van Os, J., ... & Rutten, B. P. F. (2011). Caloric restriction attenuates age-related changes of DNA methyltransferase 3a in mouse hippocampus. *Brain, behavior, and immunity*, 25(4), 616-623.
15. Boulle, F., Goethals, A., Chinwang, J., Pannaye, P., Romano, A., Lanfumey, L., & Kenis, G. (2012). P. 4.007 Pharmacological modulation of epigenetic regulation of BDNF-TrkB signaling in differentiated SH-SY5Y human neuroblastoma cells. *European Neuropsychopharmacology*, 22, S89-S90.