



ACS Chapter
Nigeria

2018

Project SEED in Nigeria

Program Report



**Hands-On Research for
High School Students**



Table of Contents

Executive Summary	3
A summary of the 2018 Project SEED Pilot Program	
The Project SEED Nigeria Team	4
Chapter 1 - Introduction	5
Call for Application Evaluation/Review of Applications Final Selection Interview and Decision	
Chapter 2 - Program Content/Implementation	7
Chapter 3 - Summary of Events	9
Opening Ceremony Training and Research Closing Ceremony	
	9
Chapter 4 - Financial Report	12
Grant Expenditure Details	
Chapter Five - Conclusion, Acknowledgments and Feedbacks	13
Conclusion Acknowledgments Feedbacks	
Appendixes	
Appendix 1 - Application Decision & Proposal	
Appendix 2 - Candidates' Application forms and sample request letter to schools for nomination	
Appendix 3 - Application Review and Final Decision	
Appendix 4 - Weekly Program Evaluation	
Appendix 5 - Research Report (Saviour Ibok)	
Appendix 6 - Research Report (Atinuke Usangha)	
Appendix 7 - My Experience (Saviour Ibok)	
Appendix 8 - My Experience (Atinuke Usangha)	
Appendix 9 - Training Manual	
Appendix 10 - Program for the opening ceremony	
Appendix 11 - Award Letters, Acceptance and Consent forms	
Appendix 12 - Certificates	
Appendix 13 - Receipts	

Executive Summary

The ACS Nigeria chapter received a funding offer to execute a pilot Project SEED program as part of the celebration marking 50 years of Project SEED (See appendix 1). The goal of Project SEED is to provide economically disadvantaged secondary school students an opportunity to participate in research and learn what it is like to work in science-related fields through a hands-on experience. During summer break in Nigeria, 40 prospective applications were received, and 2 students were successful in the highly competitive selection process. The students participated in the pilot program from July 23 through September 13, 2018; the program lasted for 8 weeks. The program commenced with an induction and practical training on safety and research, followed by research project conducted at the Akwa Ibom State Ministry of Science and Technology, research and development laboratory. Students' progress and mentoring sessions were evaluated on weekly basis and at the end of the program, students wrote their individual experience in the program (see appendix 7 and 8). Information retrieved from interviews, evaluation forms and individual reports indicates that the Project SEED program was successful in improving their laboratory skills, self-confidence and has increased their passion in pursuing a career in the chemical sciences.

In this report, we capture the detailed implementation of Project SEED in Nigeria covering the activities, research reports by the students, the financial report as well as program materials.

We would like to express our sincere gratitude to American Chemical Society especially the Committee on International Activities for the opportunity to implement this program in Nigeria, noting that this is the first time Project SEED has been hosted in any African Country. The success of the program in Nigeria for the first time was because of strong partnership and commitment on the part of volunteers and mentors. The Chapter is ready to fully upscale Project SEED arising from the success of the Pilot Program.

Edu Inam

ACS Nigeria - Secretary

The Project SEED Nigeria Team Members

Name	<i>Affiliation</i>
Prof. Joshua Obaleye	<i>Chair, ACS Chapter - Nigeria</i>
Prof. Folahan Adekola	<i>Vice Chair, ACS Chapter - Nigeria</i>
Dr. Edu Inam	<i>Secretary, ACS Chapter - Nigeria</i>
Dr. Lami Nnamonu	<i>Treasurer, ACS Chapter - Nigeria</i>
Dr. Atim Johnson	<i>Project SEED Co-ordinator in Nigeria</i>
Prof. Nse Essien	<i>Honourable Commissioner, Ministry of Science & Technology (MST), Akwa Ibom State</i>
Engr. Richard Ekim	<i>Permanent Secretary, MST</i>
Mr. Gerald Inoh	<i>Director – Science, MST, Akwa Ibom State</i>
Mrs. Mfon Ukut	<i>Director, Science Promotion, MST.</i>
Dr. Benedict Ette	<i>Head of Research & Publication, MST, Akwa Ibom State</i>
Mr. Peter Paschal Akpan	<i>Safety Manager, MST</i>
Mr. Edem Ekpo	<i>Lab Managr, MST</i>
Ms. Angela Eyo	<i>Scientific Officer/Analytical Chemist, MST</i>
Dr. Ayanime Akpan	<i>Chair, Science Teacher Association of Nigeria (STAN) & Senior Lecturer, Akwa Ibom State University (AKSU)</i>
Mr. Aniekan Akpakpan	<i>Lecturer, Akwa Ibom State University (AKSU), Ikot Akpaden Member, Chemical Society of Nigeria</i>
Nnanake-Abasi Offiong	<i>Research Assistant, International Centre for Energy and Environmental Sustainability Research (ICEESR), PhD Student, University of Uyo, Nigeria</i>
Akwaowo Inyangudoh	<i>Research Assistant, ICEESR, MSc Student, University of Uyo</i>
Saviour Ibok	<i>SEED Student, Itam Secondary School Itam, Itu</i>
Atinuke Usangha	<i>SEED Student, Community Secondary School, Aka Offot, Uyo</i>

CHAPTER ONE: INTRODUCTION

The Nigeria International Chemical Sciences Chapter in January submitted a proposal to be considered for 2018 Project SEED Global Pilot Program. The application was successful and in February, the chapter received the award letter. The chapter set up a sub-committee to execute the program. The first task of the committee was to ensure best international practice in the selection of the two candidates for the program. In this section, the procedure and processes involved in selecting the two students is presented.

Call for Applications

On April 25, 2018, a call for nomination was sent out to different public schools via call letters. The schools were selected based on their previous participation in science competitions and located in rural communities. A total of forty (40) applications were received (see appendix 2 for more details).

Evaluation/Review of Applications

All candidates' application forms were reviewed and each applicant earned point(s) based on their previous academic performance, awards, motivation for science and recommendation from nominating schools (see attached evaluation sheet). Candidates with scores below 45% were not short-listed for the next selection process. As a result, a total of twenty six (26) candidates from 8 schools scaled through the evaluation process and were invited for the final selection test (see appendix 3).

Final Selection Interview and Selection Decision

A paper based test (PBT) was administered during the final selection test and questions were drawn from the following subjects: chemistry, physics, mathematics, biology and ICT. Upon submission, open marking and computation on a spreadsheet was carried out. Two candidates emerged as the overall best and earned the total score (average of selection test score and evaluation score) of 75.42 % and 72.25 %, respectively (see appendix 3).



A. During the selection test



B. Dr. Johnson addressing the teacher shortly after the selection

Photo courtesy of Akwaowo Inyangudoh

The preliminary evaluation and final test led to a very successful and satisfactory selection process and the selected candidates were:

1. Mr. Saviour Joseph IBOK of Itam Secondary School, Itam, Itu (75.42 %), and
2. Miss Atinuke Nelson USANGHA of Community Secondary School, Aka Offot, Uyo (72.25 %)



Photo courtesy of Akwaowo Inyangudoh

Back Row (L-R): Mr. Aniekan Akpakpan (CSN); Mrs. Uduak Fred Udosen (CSS, Aka Ofot, Uyo);
Mrs. Anne Nnamnso (ISSI, Itu); Mr. Akwaowo Inyangudoh; Mr. Nnanake-Abasi Offiong
Front Row (L-R): Dr. Anyanime Akpan (STAN –AKS); Ms. Atinuke Usangha (CSS, Aka Ofot, Uyo);
Mr. Saviour Ibok (ISSI, Itu); Dr. Atim Johnson; Dr. Benedict Ette

CHAPTER TWO: PROGRAM CONTENT AND IMPLEMENTATION

The project team met and agreed on the content of the program to cover the eight weeks the students were to spend on the program. The Akwa Ibom State Ministry of Science and Technology Research and Development laboratory was chosen as the laboratory to host the students for the Project SEED pilot program. It is on this note, that the team members include representatives from this government ministry. In this section, the weekly activity and execution is presented.

Week 1: (a) Acceptance/induction to laboratory

(b) Introduction of training and research topic

The students were inducted on Monday July 23, 2018 at the Research & Development Laboratory of the Akwa Ibom State Ministry of Science and Technology in the presence of the key officers of the Ministry including the Honorable Commissioner for Science and Technology, Directors, Lab Manager, Scientific Officers and ACS Nigeria chapter members. The students were given training manual (see appendix 9) and officially handed over to their mentors for commencement of training. The Director of Science in the Ministry, Mr. Gerald Inoh, introduced the students to the contents of the training program as well as the research project they would undertake.

Week 2: (a) Training on laboratory safety rules and regulations

(b) Training on analytical equipment and its principles

The students were trained on laboratory safety and they found the training to be very interesting. The safety training included practical sessions where the students were able to identify safe and unsafe acts and conditions in the laboratory workspace, and became conversant with the laboratory safety rules and regulations. The training was handled by Mr. Peter Paschal – the Safety Manager in ministry who confirmed that the students passed the various safety tests. Mr Edem Ekpo, the lab manager trained the students on different analytical equipment and their working principles.

Week 3: (a) Sample collection, administration, documentation and preparation.

(b) Data handling and reporting writing.

In the third week of training, the Head of Research in the Ministry - Dr. Benedict Ette and Ms. Angela Eyo, an Analytical Chemist jointly trained the students on sampling, sampling techniques, documentation, preparation and data handling; the students reported that this aspect was very important for any analysis (see appendix 4). Report writing was taken by Mr. Nnanake-Abasi Offiong and Akwaowo Inyangudoh, Research Assistants at the International Centre for Energy and Environmental Sustainability Research (ICEESR), University of Uyo, Nigeria. Students were shown how to surf the web for secondary materials for literature review, how to review related literature and reference them as well. Other topics like data

handling, plagiarism, abstract writing, giving a scientific talk and presenting a poster were also covered.

Week 4: *Analytical Methodology*

- Analysis of physicochemical parameters in water
- Analysis of trace metals in water
- Analysis of hydrocarbon in water

The student spent this week learning the various methods of measuring the levels of trace metals, physicochemical parameters and total hydrocarbon content in water samples.

Week 5: *Field Work (practical application of week 3a)*

The students were exposed to water sampling by way of a field trip to Uquo and its environs in Esit Eket Local Government Area, Nigeria. They collected ground and surface water samples for laboratory analysis. Students were able to prepare water samples for physicochemical and trace metals analysis under the supervision of the lab manager and scientific officers.

Week 6: *Bench Work*

During this week the students worked on their research project on “quantification of levels of selected traced metals in water collected from Esit Eket, Nigeria”. They started by sample preparation which was digestion of the samples; preparation of stock solutions and blank; and measurement using AAS. They were guided on how to determine some of the physicochemical parameters (pH, temperature, turbidity, EC, TSS, TDS, salinity, DO, BOD, Nitrate, Nitrite, THC, hardness, sulphate) and level of trace metals (Cadmium(Cd), Arsenic(Ar), Lead(Pb), Aluminum(Al) and Mercury(Hg)). See appendix 5 and 6 for the results of their bench work.

Week 7: *Report writing and review/submission*

The students independently wrote their research reports and submitted for evaluation (see appendix 5 and 6 respectively for their report). The research reports submitted by the students were reviewed by Dr. Benedict Ette, Nnanake Offiong and Akwaowo Inyangudoh, and students were able to make necessary corrections for final submission.

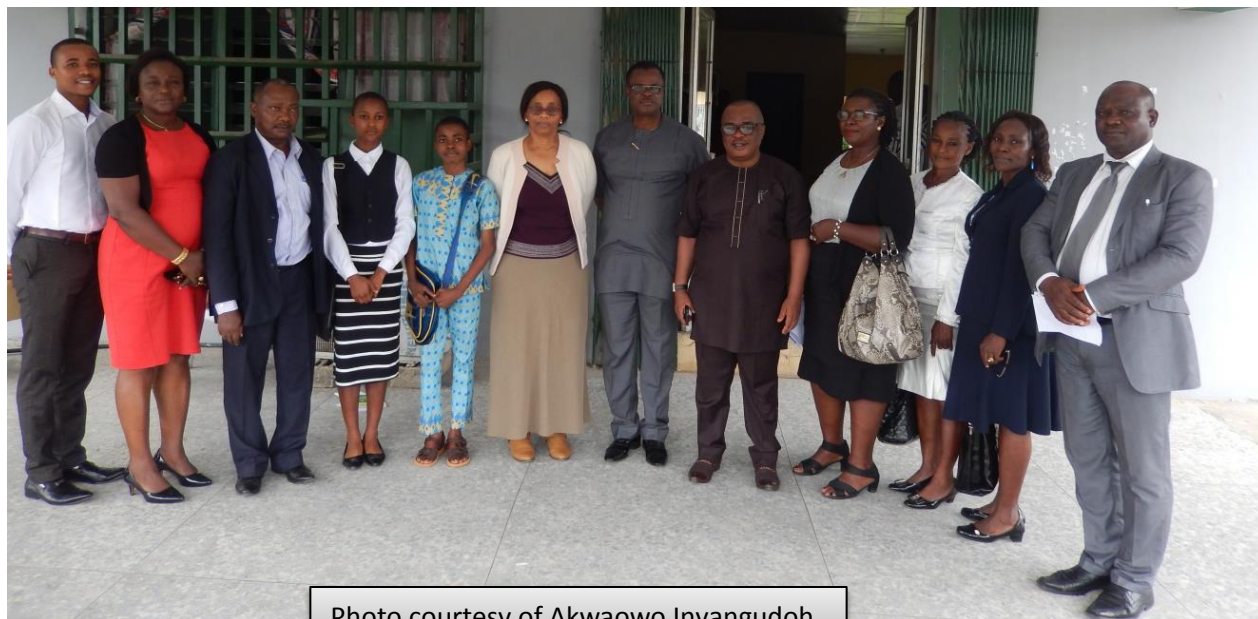
Week 8: *Evaluation, mentoring session and closing*

Program evaluation forms were administered to both the students and supervisors on every Fridays of the week and responses were satisfactory (see appendix 4 for details). This week was used by the students to tidy up their report. And the closing ceremony was held on September 13, 2018. Certificates were given to the students, mentors and volunteers to wrap up the 2018 Project Seed Pilot Program.

CHAPTER 3: SUMMARY OF EVENTS

Opening Ceremony

The program started with an opening ceremony held on Monday July 23, 2018 (see appendix 10 for opening ceremony program). In attendance were: Prof. Nse Essien - the Honourable Commissioner, Ministry of Science & Technology (MST), Akwa Ibom State; Engr. Richard Ekim, Permanent Secretary – MST; Mr. Gerald Inoh – Director, Science at MST; Dr. Benedict Ette – Head of Research & Publication, MST; Mrs. Mfon Ukut - Director, Science Promotion, MST; Dr. Anyanimes Akpan – Chairman, Science Teachers Association of Nigeria (STAN), Akwa Ibom State Branch; Miss Atinuke Usangha & Mr. Saviour Ibok, the 2018 ACS Project SEED Awardees; Mr. Akwaowo Inyangudoh and Mr. Nnanake-Abasi Offiong, 2018 ACS Project SEED Team Members. The award recipients - Ms. Atinuke Nelson Usangha and Mr. Saviour Joseph Ibok after receiving their award letters (see appendix 11) were charged to seize the opportunity to develop their skills for a career in science and were inducted to start the 8-week long research training in the R & D Laboratory of the Akwa Ibom State Ministry of Science & Technology, Uyo.



L-R: Mr. Nnanake-Abasi Offiong, Mrs. Mfon Ukut, Mr. Gerald Inoh, Ms. Atinuke Usangha, Mr. Saviour Ibok, Dr. Edu Inam, Prof. Nse Essien, Engr. Richard Ekim, Dr. Anyanimes Akpan, Mrs. Nelson Usangha, Dr. Atim Johnson and Dr. Benedict Ette.

Trainings and Research

The first week was dedicated to laboratory safety training. Thereafter, the students were shown different analytical equipment and its basic principles. In the third and fourth week, they were guided on their research experiments by the mentors; these include sample collection, administration and preparation, analysis, data handling and report writing.

The trainees went for field work, followed by bench work in preceding weeks of the training exercise. After sampling, the research students were able to prepare the water samples for analysis using the digestion method. They determined the levels of trace metals and other physicochemical parameters in the water samples to include salinity, pH, temperature, turbidity, biological oxygen demand (BOD), Nitrate, Nitrite, dissolved oxygen (DO), total suspended solid (TSS), total dissolved solid (TDS), sulphate, hardness, electric conductivity (EC) and total hydrocarbon content (THC). The students used the seventh week to write their research reports, and these were reviewed by their mentors for final submission.



Photo courtesy of Akwaowo Inyangudoh

During a training on Report Writing



During sample collection at Esit Eket



Photo courtesy of Akwaowo Inyangudoh

During Bench work

Closing Ceremony

The Commissioner for Science and Technology, Prof. Nse Essien has applauded the two budding scientists in the State for their dedication in the American Chemical Society Project Seed program in collaboration with the State government. He commended ACS for the initiative and stressed the importance of practical in scientific training. Prof. Essien expressed the hope that the mentorship the students have received in laboratory work will see them through in their chosen fields of specialization. The Coordinator of Project SEED program of the ACS, Dr. Atim Johnson said having gone through the reports of the students, it was clear that the objectives of the program have been achieved. She thanked the management and staff of the Ministry of Science and Technology for providing an enabling environment for the training and ACS for this innovation. The students, Saviour Ibok and Atinuke Usanga after receiving their training certificates (see appendix 12 for certificates) spoke separately expressing their gratitude to ACS and the State government for the opportunity provided them to embark on the training. They gave testimonies of their laboratory experience in experimentation and promised to make the state proud soon.

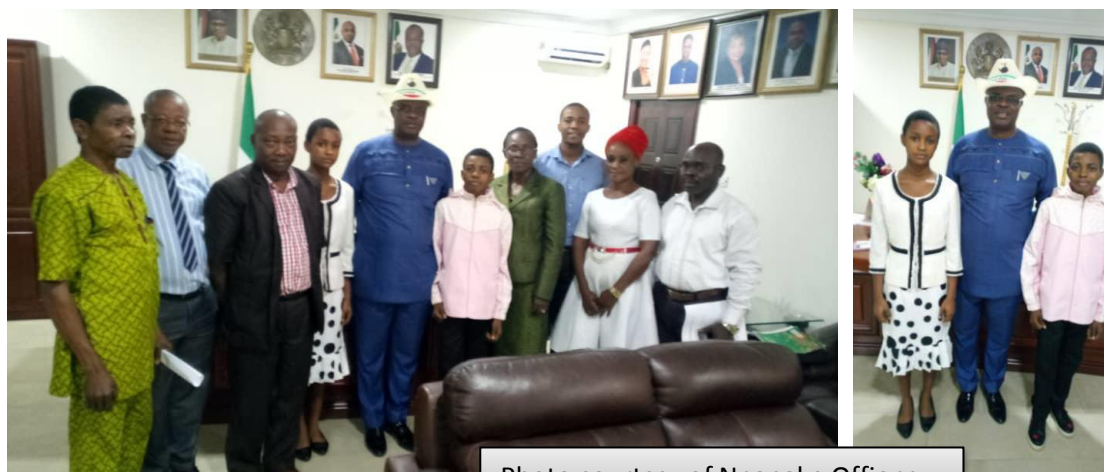


Photo courtesy of Nnanake Offiong

During the closing ceremony

CHAPTER FOUR: FINANCIAL REPORT

The chapter received the sum of Three thousand Seven Hundred (3,700) dollars which was converted at an exchange rate of 358 naira to a dollar. The naira equivalent was one million one hundred and ninety-five thousand, three hundred naira only. The detailed expenditure is presented in the Table below while the receipts are in Appendix 13.

Grant Expenditure Details

S/N	ITEM DESCRIPTION	AMOUNT	
		NG NAIRA (₦)	US DOLLARS (\$)ⁱ
A	STIPEND, TRANSPORTATION & WELFARE FOR 2 STUDENTS		
A.1	Weekly stipend for 8 weeks for the 2 students	286,400	800.00
A.2	Payment for transportation fare for the 2 students (8 weeks, excluding weekends)	240,000	670.39
A.3	Procurement of laptops (2)	186,000	519.55
A.4	Purchase of laptop bags, hardcover folders, and lab notebooks (2 each)	27,500	76.82
A.5	Purchase of PPEs for 2 students	105,000	293.30
A.6	Purchase of internet MODEMs for 2 students	18,000	50.28
	Sub-total	862,900	2,410.34
B	GLASSWARE AND REAGENTS FOR RESEARCH		
B.1	Glassware and Reagents Payment made directly to the host R&D Laboratory	214,000	597.77
	Sub-total	214,000	597.77
C	ADMINISTRATION COST		
C.1	Postage	2,410	6.73
C.2	Snacks & Water During Interviews, Meetings, Opening and Closing Ceremonies	20,350	56.84
C.3	Transportation reimbursements to participating schools & Cost of Fueling Vehicles	54,350	151.82
C.4	Renting of Projector and screen for 3 weeks	35,000	97.77
C.5	Purchase of office supplies, stationeries, printing of training manuals, certificates and letters	128,480	358.88
	Sub-total	240,590	672.04
	GRAND TOTAL (A + B + C)	1,317,490	~3,680.15

Exchange rate is set at 358 per USD

N/B: Approved amount was 3,700 USD. The difference of 20 USD is for bank charges.

CHAPTER FIVE: CONCLUSION, ACKNOWLEDGEMENTS AND FEEDBACKS

Conclusion

The project was well received by the community and stakeholders. All that participated gave positive comments on this initiative by America Chemical Society and indicated their interest to become members of the Society. The project succeeded in creating awareness among science teachers in Akwa Ibom State. 12 persons have indicated interest in joining ACS and 2 have successfully registered while 2 others have renewed their memberships. The student beneficiaries are very determined to become scientists as well as share their experiences with others in their school. The Chapter would be interested to expand this program.

Acknowledgements

We would like to express our sincere gratitude to American Chemical Society especially the Committee on International Activities for the opportunity to implement this program in Nigeria, noting that this is the first time Project SEED has been hosted in any African Country. The success of the program in Nigeria for the first time was because of strong partnership and commitment on the part of volunteers and mentors.

We acknowledge the support of the Executive Committee members of the ACS Nigeria Chapter: Prof. Joshua A. Obaleye (Chair); Prof. Folahan A. Adekola (Vice Chair); Dr Edu J. Inam (Secretary); Dr. Lami A. Nnamonu (Treasurer) and Sampson D. Umoh (Assistant Secretary). The immense contribution of the Program Coordinator, Dr. Atim S. Johnson is acknowledged.

This training manual was compiled and reviewed by a team of experts from the University of Uyo (UNIUYO) and the Akwa Ibom State Ministry of Science and Technology (MST), Uyo, Akwa Ibom State. Many thanks are due to Dr Edu J. Inam, Dr Atim S. Johnson, Dr. Anyanime Akpan, Mr. Gerald G. Inoh, Dr. Benedict B. Ette, Mr. Akwaowo I. Inyangudoh, and Mr. Nnanake-Abasi O. Offiong, Mr. Edem Ekpo, Mr. Peter Paschal Akpam and Ms. Angela Eyo. Finally, we express our gratitude to Prof. Nse U. Essien, Honorable Commissioner, Akwa Ibom State Ministry of Science & Technology who agreed to collaborate and host the research training.

Feedbacks

"I am very impressed for this wonderful opportunity given to my child, Atinuke have been receiving invites for programs but this one is outstanding; many thanks to the organizers" – **Mrs. Nelson Usangha**

"Although my students missed out, the selection exercise was very transparent" – **Mrs. Mary Uwem Akpan** (*Chemistry Teacher, Uyo High School & newly registered ACS member*).

"This is my first time of seeing this kind of opportunity for secondary school students" – **Mr. Paschal Akpan**, Ministry of Science and Technology, Uyo.

"The government should support this program because the science students can't survive without lab work. ACS should accommodate more students in a program like this" – **Mr. Effiong Iseh**, *Principal – Ibesikpo Secondary Commercial School, Nung Udoe*.

50th
Anniversary
Project
SEED
1968 - 2018



ACS
Chemistry for Life®

AMERICAN CHEMICAL SOCIETY

Project SEED is a program of the
American Chemical Society, Education Division

1155 Sixteen Street, NW Washington, DC 20036

projectseed@acs.org

1-800-227-5558 ext. 4380

www.acs.org/projectseed