



# **2016 Region 6 Awards Program**

## **Categories, Descriptions, Nomination Suggestions, with Real Examples of Previous Winners**

### **Very Important General Instructions for writing all Nominations in all Award Categories**

**Be very thorough because if this Nominee wins this award at your Section level, it will be passed up first to the Area awards level and then perhaps to the Region level. Keep in mind there will be many awards committee people reading this nomination form who probably do not know the Nominee and they may be more than 1000 miles away. They are depending solely on your nomination form to evaluate this particular Nominee for this award.**

### **Award Categories for Individuals**

#### **Outstanding Engineer**

To recognize IEEE members of Region 6 who through their technical abilities have made outstanding contributions to their profession. It recognizes the development of new technical concepts, significant patents, development of new devices, the development of new applications, new designs, or significant cost reductions using known techniques.

#### **Nomination Suggestions**

We want to honor those members who have advanced our knowledge and improved Humanity through any of the technical subjects covered by the Societies, Councils, and Affinity Groups of the IEEE. You will need to include a complete CV, a list of all published papers, and patents by the Nominee. If the Nominee was recognized by another group of his peers including his company, a university, or a government organization, please include those. You must substantiate the importance of the contribution of the Nominee. Including several written testimonials or endorsements from others is very helpful.

#### **Examples of Prior Winners**



## 2011 Outstanding Engineer: Norman Schneidewind

Supporting information:

In 2001, he received the IEEE "Reliability Engineer of the Year" award from the IEEE Reliability Society. In 1993 and 1999, he received awards for Outstanding Research Achievement by the Naval Postgraduate School. He was selected for an IEEE USA Congressional Fellowship for 2005 and worked with the Committee on Homeland Security and Government Affairs, United States Senate, focusing on homeland security, cyber security, and privacy.

He authored the following publications:

- Norman F. Schneidewind, Cyber Security Models, IGI Global book, Cyber Warfare and Cyber Terrorism, edited by Dr. Lech J. Janczewski and Dr. Andrew M. Colarik, 2007.
- Norman F. Schneidewind, "Cyber Security Prediction Models", The R & M Engineering Journal, American Society for Quality, September 2006, Volume 26, Number 3, Part 4, pp.23-28.
- Dr. Norman Schneidewind, Solutions to the threat of cyber terrorism to homeland security, Special Report on Cyber and Homeland Security Dr. Norman Schneidewind, IEEE Congressional Fellow, Fellow of the IEEE, First published by AuthorHouse 12/22/05.
- Norman F. Schneidewind, PhD, IEEE Fellow, IEEE Congressional Fellow, Professor of Information Sciences, Naval Postgraduate School, Monterey, CA, "Homeland Security and Reliability Airport Model", Library of Congress Cataloging-in-Publication Data, ISBN 0-9701923-4-7, April 2006, 43 pages.

### Professional Achievements

An article about his Engineer of the Year award was published in the Monterey, California Herald, on 26 February 2002 and in the U.S.C. Marshall School Magazine, April 2002. In addition, this article was published in the Naval Postgraduate School Journal, Volume II, Issue 1, Winter, 2002, and posted on the Naval Postgraduate School Public Affairs Office web site.

In March, 2006, he received the IEEE Computer Society Outstanding Contribution Award: "For outstanding technical and leadership contributions as the Chair of the Working Group revising IEEE Standard 982.1", signed Debra Cooper, President, IEEE.

He is the developer of the Schneidewind software reliability model that is used by NASA to assist in the prediction of software reliability of the Space Shuttle, by the Naval Surface Warfare Center for Tomahawk cruise missile launch and Trident software reliability prediction, and by the Marine Corps Tactical Systems Support Activity for distributed system software reliability assessment and prediction. This model is recommended by the IEEE and the American Institute of Aeronautics and Astronautics Recommended Practice for Software Reliability. In addition,



the model is implemented in the Statistical Modeling and Estimation of Reliability Functions for Software (SMERFS), software reliability-modeling tool.

Dr. Schneidewind has been interviewed by several organizations regarding his work in software reliability, including the following: New York Times article, which was published on 7 February 2003, about the Space Shuttle software development process in conjunction with the Columbia tragedy and by the Associated Press about the same subject; National Public Radio, Montgomery, Alabama on 1 April 1, 2002; and by The Bent, Tau Beta Pi, all engineering society, magazine, about his professional accomplishments on 4 November 2002.

### **Schneidewind Model Implementation Status and Reference Applications**

The model has been implemented in FORTRAN and C++ by the Naval Surface Warfare Center, Dahlgren, Virginia as part of the Statistical Modeling and Estimation of Reliability Functions for Software (SMERFS). It can be run on an IBM PCs under all Windows operating systems.

Known applications of this model are:

- IBM, Houston, Texas: Reliability prediction and assessment of the on-board NASA Space Shuttle software
  - Naval Surface Warfare Center, Dahlgren, Virginia: Research in reliability prediction and analysis of the TRIDENT I and II Fire Control Software
  - Marine Corps Tactical Systems Support Activity, Camp Pendleton, California: Development of distributed system reliability models.
  - NASA JPL, Pasadena, California: Experiments with multi-model software reliability NASA Goddard Space Flight Center, Greenbelt, Maryland: Development of fault correction prediction models. [B55]
  - NASA Goddard Space Flight Center, Greenbelt, Maryland: Development of fault correction prediction models.
  - NASA Goddard Space Flight Center
  - Hughes Aircraft Co., Fullerton, California: Integrated, multi-model approach to reliability prediction
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## 2015 Outstanding Engineer: Massimo Mitolo

Supporting information:

Besides his numerous books and scientific publications, Dr. Mitolo's ingenuity in the field of power systems and more specifically electrical safety engineering is a rare quality found in any engineer that I know. He has been consistently contributing to the IEEE community in very many roles for more than three decades. His outstanding achievements are well documented in his herein attached resume.

### IEEE positions and other responsibilities

- **Senior Member** of the Institute of Electrical and Electronics Engineers (IEEE).
- **Member** of the IEEE Industry Applications Society (IAS)
- **Member** of the IEEE Product Safety Engineering Society (PSES)
- **Chair**, IEEE Orange County Section.
- **Treasurer**, Executive Board of IEEE Industry Applications Society (IAS).
- **Chair**, *Financial Planning Committee*, IEEE Industry Applications Society (IAS) Council.
- **Secretary** of the *Industrial & Commercial Power Systems Department* of the IEEE Industry Applications Society (IAS).
- **Past Chair**, *Power Systems Engineering (PSE) Main Technical Committee*, *Industrial & Commercial Power Systems Department*, IEEE Industry Applications Society.
- **Chair**, *Power Systems Analysis Subcommittee*, *Industrial & Commercial Power Systems Department*, IEEE Industry Applications Society.
- **Chair**, Technical Books Coordinating Committee IEEE P3003.1 "*Recommended Practice for the Grounding of Industrial and Commercial Power Systems*".
- **Chair**, Technical Books Coordinating Committee IEEE P3003.2 "*Recommended Practice for Equipment Grounding in Industrial and Commercial Power Systems*".
- **Co-Chair**, Technical Books Coordinating Committee IEEE P3002.2 "*Recommended Practice for Conducting Load-Flow Studies of Industrial and Commercial Power Systems*".
- **Member**, Technical Books Coordinating Committee IEEE P3002.1 "*Recommended Practice for Conducting Short Circuit Studies of Industrial and Commercial Power Systems*".
- *Power System Engineering Committee* **Administrator**, IEEE ScholarOne Manuscript.
- **Associate Editor**, *Power Systems Engineering Committee*.

### What specific significant or distinguished contributions or achievements made you decide to submit this nomination?

I had the privilege to work in the same office with Dr. Mitolo and I have never met anyone this precise, accurate and knowledgeable in so many aspects of the electrical engineering field. Dr. Mitolo's performance, motivation and professionalism shall serve as an industry standard for years to come. Remarkable is his work in the field of the electrical safety engineering, substantiated by over 90 IEEE journal papers and two textbooks.



His resume was attached.

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### **Outstanding Leadership and Professional Service**

To recognize IEEE members of Region 6 who through their professional and technical abilities have made outstanding and noteworthy contributions to the Institute, their communities, fellow professionals and fellow man. The award is not designed to recognize a single achievement, but rather collective contributions complemented by singular works exemplifying the objectives and attributes of IEEE.

### **Nomination Suggestions**

We want to honor those members who have contributed a large amount of time to IEEE volunteer positions they have held and they have made a lasting impact on the IEEE. You must substantiate the importance of the contribution of the Nominee. Including several written testimonials or endorsements from others is very helpful. Please note that this is an award for Leadership in the IEEE. No matter how commendable, please do not include examples of community service.

### **Examples of Prior Winners**



## **2012 Outstanding Leadership and Professional Service: Brian Berg**

Supporting information:

Brian is currently the chair of the Santa Clara Valley Section. He additionally helps organize many conferences. Recently he spearheaded a successful effort to get an IEEE Milestone for Data Storage in Flash Memory approved, and it will be dedicated at events at the Computer History Museum (Mountain View, CA) on Mon, Aug. 20 and at Flash Memory Summit (Santa Clara Valley) on Tue, Aug. 21.

Brian also organized a special event to honor Congresswoman Zoe Lofgren for her contributions to engineering in the entire Bay area. This will occur at Marvell Semiconductor on Sat. Sept. 1. Engineering business leaders have been invited to honor her.

For many years Brian has served as a dynamic leader of IEEE CNSV, bringing sustained energy and management excellence to our group. Examples of his contributions include serving as a board member, finding excellent speakers for our monthly meetings, chairing meetings, arranging CNSV volunteers for manning booths at conferences, overseeing web activities, preparing web pages for each member, managing list servers for meeting announcements, preparing and broadcasting meeting announcements, and bringing pizza to the meetings.

### **What IEEE positions and other responsibilities has the nominee had in the last five+ years that relate to this nomination?**

- IEEE SCV Section, 2012 Chair, 2011 Vice-Chair, 2010 Secretary
- IEEE Metro Area Workshop for Region 6, 2012 Program Chair
- IEEE Consultants' Network of Silicon Valley, 2012 At-Large Director, 2008-2011 Director, 2006-2007 Chair

### **What specific significant or distinguished contributions or achievements made you decide to submit this nomination?**

The primary distinguished contribution that motivated this submission is the steady flow of excellent speakers at our monthly meetings. This is critical to strong attendance, and members have been thrilled with many of the speakers.

**His resume was attached.**

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## 2015 Outstanding Leadership and Professional Service: Edward M. Aoki

Supporting information:

- 2015 SCV Section Secretary
  - Ed Aoki has driven the design and use of SAMIEEE integrated with vTools to create a SAMIEEE query that lists the Elected Officers and Webmasters in SCV-Section and its subordinate Organizational Units (Chapters, Councils, Affinity Groups as well as the Chairs of the Section Committees; this change permits Section Officers to create, on demand, an up-to-date listing of positions and names reported to IEEE-HQ. This change was initiated by and based on Ed's two years of experience as Chair (2013-2014) when the current/accurate data on the Section OU ExCom was not being updated by 2014 Section Secretary due to time pressures. The design of this query required the creation of new Positions/Titles in vTools.

Similar effort applied by Ed to a query for the Student Branches, Student Branch Chapters (STB/SBC/SBA) has created a similar an up-to-date listing of positions and names reported to IEEE-HQ through vTools Officers.

These modified/preformatted SAMIEEE queries are available under "Shared Folders/IEEE Volunteer Queries/SFBAC" as are separate queries for member data at the SFBAC, SCV, SF, OEB OU levels. Most critically, these results are available to update the SCV-Section ExCom ListServ without requiring inordinate time from Section leadership; these results are also in a form that can be used as a TOOL of the Section OU leadership, rather than only as a required report – a difference in perspective..

Ed has also been working with IEEE MGA to create current/correct "L31" reports. The existence of the current "L31" (now vTools Meetings) and vTools Officers reports enabled Ed to have create the MGA Section Award submission in 2 hours rather than the 2 months that a previous submission in 2009 required.

- 2015 SCV Section Finance Committee Chair
  - Ed oversaw Beta-Testing of the new (2014-2015) Bank\_Upload\_Template used for Financial Reporting, Ed and the Section Treasurer contributed corrections and improvements to the BUTemplate to minimize user errors. SCV-Section submitted/emailed > 620 BUTemplates for the 54 Bank Accounts in this Section for 2014 financial activity. Ed pressed IEEE-Finance with the view that the Reporting Processes should be modified to be a OU's ExCom "tool to manage the OU", not a mere required reporting tool imposed by IEEE.
  - The 2015 Financial Reporting of FY2014 was 90% completed by January 15, 2015 because we had implemented the Preliminary Financial Reporting process developed by the Section Treasurer; the Section received the accuracy/timeliness \$ 4600 bonus for meeting the deadline of 15 February 2015.
- 2015 SFBAC Officer Training Organizer and Presenter



- Ed talked to and recruited Marguerite Gargiula of IEEE MGA for vTools (IEEE Member & Geographic Activities/ Information Management Project Manager) which resulted the extension of the historic duration of the vTools session from 20 minutes (with the content so condensed that it was confusing) to 1.5 hours. Attendees commented that the detailed content was helpful rather than confusing.
- Ed developed and described a simplified SAMIEEE Query process in a set of slides. An offer to have a refresher interactive IEEE Webex training session was deemed not necessary in two instances, indicating that the 2015 training process was more effective than in prior years.
- 2015 SFBAC Treasurer
  - In addition to the required 1099 reports and W-9 forms, Ed provided the Financial Report for 2014 activities using the NetSuite BUTemplate process.
- 2014 SCV Section Chair
  - Ed found that various reports required by IEEE-HQ took time to develop and update; the lack of data for current ExCom members was a deterrent to our OU Chairs.
  - Ed worked with IEEE MGA to understand the end-results of the various reports and to incorporate the SAMIEEE and vTools in satisfying the reports. See the first 3 paragraphs of the 2015 achievement for the results of this investigation, assessment and modification of the SAMIEEE and vTools reporting processes by SCV-Section.
- 2014 SCV Section Finance Committee Chair
  - [Background: SCV-Section did not meet the 2014 deadline for submission of the Financial Report covering 2013 activities and was denied the accuracy/timeliness 10% (or nearly \$ 5000) bonus.]
  - Eager to avoid a reporting delay in 2015 and to enhance the learning and rapid feedback/correction based on errors made by OU interpretation and execution of the instructions associated with the BUTemplate, Ed encouraged and supported the Section Treasurer in the design and implementation of a Preliminary Financial Report process. The results of this process were reported at SFBAC Officers Training in January 2015.
- 2014 SCV CPMT Chapter Chair
  - Ed and the CPMT Treasurer worked with Effective Training Associates to reconcile the income and receipts (2011-2013) of the cooperative effort to deliver professional training to SCV members at a discount. The SCV-TMC chapter received its share of the surplus.
- 2014 SFBAC Treasurer
  - Ed gathered SFBAC financials and submitted the NetSuite report early in 2015.





- 2014 GHTC Treasurer
  - While completing the Financial Report for GHTC2014, Ed determined that the Account Codes (A/C) available in the Chart of Accounts (COA) of IEEE's Conference-Finance were suited to the needs of the HQ accountants but were not compatible with the Conference budget planning process and Conference results reporting for the following year. "Missing" A/C were identified and notified to Conference-Finance who said they would investigate the situation. Ed pressed Conference-Finance with the view that the Reporting Process should be modified to be a Conference Organizer tool to manage the Conference, not merely a required reporting tool imposed by IEEE.
  - Ed continued the practice based on the financial review and assessment initiated in 2013 of documenting and enforcing the financial requirements of any spending in the MOU which requires the signature of the Financial Sponsoring Parties. Those documented financial requirements led to strict control of expenses, avoided any unplanned losses, and resulted in a distributed surplus of more than \$36,000 to the Financial Sponsors including SCV-Section in 2015 after receipt of funds from NASA.
  - As the principal investigator, Ed and the Conference Chair delivered the NASA Grant Application (for \$38,200) to IEEE-Grants Office March 31, 2014. GHTC2014 received the approval to apply expenses dated after July 27, 2014 to NASA Grant NNX14AO25G. NASA transferred \$38,200 to IEEE-Grants Office in February 2015; the funds were distributed to the Financial Sponsors in April 2015.
  
- 2014 SFBAC Officer Training Presenter
  - Ed organized and presented a talk on SAMIEEE. He also worked on integrating SAMIEEE and vTools-Officers to ease the Section's oversight and management of the Section's ExComs (Section and Chapters)
  
- 2013 SCV Section Chair
  - Ed spent the time learning the job and what could be done to make the job less tedious with respect to reporting.
  
- 2013 GHTC Treasurer
  - [Background: SFBAC was offered the opportunity to sponsor GHTC2013. SFBAC ExCom determined that there was no report on the performance of GHTC2012 either in terms of a preliminary financial report (expected in 1-3 months) or a summary of lessons learned (expected in 1 week). There was no indication of either a loss or surplus.]
  - Ed requested and received files from the GHTC2013 Treasurer, including invoices. Ed requested and received permission to access the GHTC2013 CBRS Account statements.
  - Based on Ed's review and assessment of the GHTC2013 finances and financial management, SFBAC agreed to grant \$10,000 on condition that there be in place a credible financial oversight; the primary Financial Sponsor, Region 6, agreed and



- proposed that Ed Aoki be Treasurer, GHTC2013, to provide that oversight and control. Ed accepted that role.
- Ed made an innovative move on the traditional IEEE Conference MOU form. Ed wrote the majority of Appendix A of the GHTC2013 MOU; that Appendix contained conditions and restrictions on subsidies and reimbursements including the approval of payments by the Chair/Vice-Chair and Treasurer on the basis of approved proposals for expenses and approval of invoices. GHTC2013 was programmatically successful (compared to GHTC2012) and returned a surplus.
  - Careful needs assessment and analysis enabled Ed to distribute a GHTC2013 surplus of \$32,000 to Region 6 and delivered a total GHTC2014 surplus of \$36,250 to the financial sponsors (Region 6, SCV Section, and Seattle Section).
- 2013 SFBAC Officer Training Presenter
    - Ed organized and presented a talk on SAMIEEE.
  - 2012 SCV Section Vice-Chair
    - Ed supported the Chair by picking up “little” projects; that utility player role enabled the Chair to organize and conduct 3 successful events that publicized the role and value of IEEE in Santa Clara Valley.
  - 2011 SCV Section Secretary
    - When the SCV Treasurer announced in March that he had taken on a consulting assignment in Europe, Ed volunteered to take on the Treasurer’s role as well.
  - 2011 SCV Section Treasurer
    - Ed was notified that since the SCV Section had reserves greater than the IEEE-Finance Audit threshold, the Section would undergo an audit - and there was \$3857 unaccounted for. After a month of digging and investigating, Ed found the source of the discrepancy and worked with IEEE-Finance to correct the records in time for the Section to receive its accuracy/timeliness bonus of over \$5000.

**What IEEE positions and other responsibilities has the nominee had in the last five+ years that relate to this nomination?**

**2015:**

SCV-Section Secretary; SCV-Reliability Society Treasurer; SCV-CPMT- member at Large of ExCom/AdCom; SFBAC Secretary backup; GHTC2014 Treasurer; SFBAC Officer Training Organizer and SFBAC Officer Training Presenter on SAMIEEE; SCV-Section Finance Committee Chair overseeing Beta-Testing of the new Bank\_Upload\_Template used for IEEE OU Financial Reporting with analysis/assessment results reported at SFBAC Officer Training Event, January 2015. GHTC2015 Ex-Officio Treasurer/Advisor.

**2014:**

SCV-Section Chair; SCV-Reliability Society Treasurer; SCV-CPMT-Chair; SFBACouncil Treasurer; GHTC2014 Treasurer; SFBAC Officer Training Presenter on SAMIEEE. SCV-Section Finance



Committee Chair overseeing the Section's procedures for Beta-Testing of the new Bank\_Upload\_Template used for IEEE OU Financial Reporting

**2013:**

SCV-Section Chair; SCV-CPMT-Chair; SFBACouncil Secretary; GHTC2013 Treasurer; SFBAC Officer Training Presenter on SAMIEEE

**2012:**

SCV Section Vice-Chair

**2011:**

SCV Section Secretary/Treasurer;

**2010-2011:**

SCV-CPMT Chair

**2005-2009:**

SCV-CPMT ExCom Member at Large.

**What specific significant or distinguished contributions or achievements made you decide to submit this nomination?**

Ed is a true hero to our Section. He served as a Section officer with me, and he continues to serve the Section and the Region in innumerable ways, particularly in analyzing and assessing the parameters and metrics of the operation of our OUs. While this application is filled with a multitude of volunteer duties, he is also a person I can call on the phone and be assured of getting excellent actionable advice and help when I need it. I thank him for this help in 2012, as noted above: "enabled the Chair to organize and conduct 3 successful events that publicized the role and value of IEEE in Santa Clara Valley."

**His resume was attached.**

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## Outstanding Engineering Manager

To honor IEEE members and current engineering managers who have successfully lead their organizations to significant contributions in research, development, or technology utilizing an appreciation and understanding of Mathematics, Science and Technology and the engineering process in product development. The Nominee has been instrumental in building employee's technical careers as evidenced by employee recognitions received. The Nominee may have influenced university and STEM education by direct interaction or indirect influence, including class visits, participation on industrial advisory boards, ABET panels, and who have encouraged students to pursue technical careers.

## Nomination Suggestions

We want to honor those members who have advanced our profession and improved Humanity by being a guiding force for their employees and for students. You will need to include a complete CV, a list of all published papers, and patents by the Nominee. Please include examples of how the Nominee was recognized by groups of his peers including his company, a university, or a government organization. You must substantiate the importance of the contribution of the Nominee. Including several written testimonials or endorsements from others is very helpful.

## Examples of Prior Winners

### 2014 Outstanding Engineering Manager: R. Stanley Williams

Supporting information:

R. Stanley Williams has been instrumental in building employees' technical careers as evidenced by employee recognitions received. He has influenced university and STEM education by direct interaction or indirect influence, including class visits, participation on industrial advisory boards, ABET panels and direct encouragement of students.

**Richard Stanley Williams** is research scientist in the field of nanotechnology and a Senior Fellow and the founding director of the Information and Quantum Science Research laboratory at HP. He is an HP Senior Fellow and Vice President at Hewlett-Packard Laboratories. He has held both individual contributor and management positions, often simultaneously, while leading groups ranging from five to ninety researchers since he joined HP Labs in 1995.

He is a co-inventor on over 160 issued US patents, with 100 more US patents pending, as well as a co-author on over 230 papers published in refereed journals since joining HP. [See attached list or Google Scholar, which lists over 25,000 citations to his published work.] Stan is only listed on patents and papers on which he was the originator or a substantial contributor of ideas – there are hundreds more publications that came out of the groups that he managed that do not have his name on them.



Stan was originally hired to bring a stronger fundamental science research focus to HP Labs, but at the same time to work on strategic topics that would eventually become differentiating HP technologies. In August 2005, the magazine *Small Times* named the patents assembled by his team at HP the world's strongest nanotechnology intellectual property portfolio. He led the research project in nanoelectronics that constructed the first intentional memristor at HP Labs in 2006, thus experimentally realizing the fourth electronic circuit element first postulated by Leon Chua in 1971. This work is described in the May and Dec. 2008 issues of *IEEE Spectrum* as well as the Sept., 2008 *EE Times*. The impact of his memristor-related research is illustrated by publication statistics from SCOPUS; since the publication of his first (of 60) memristor paper in 2008, there have been over 1100 memristor papers published that have been cited in aggregated over 11,000 times [see attachment]. In addition to memristor research, Stan initiated and managed the HP Labs research programs in photonics and optical interconnect [see "Nano-Electronic and –Photonic Interconnect," *Proc. IEEE* **96**, 230-247 (2008)] as well as nanosensors and sensing systems [see "A Central Nervous System for the Earth," *Harvard Business Review*, Feb. 2009]. His most recent significant technical contribution is the experimental demonstration and theoretical description of a scalable *neuristor*, an inorganic and electronic device that emulates the axon action potential of neurons in brains, which may provide a transistorless and low power route to nonBoolean computation [see: "A scalable neuristor built with Mott memristors," *Nature Materials* **12**, 114-117 (2013)].

As a research manager, Stan Williams has been responsible for hiring nearly 100 scientists and engineers over the past 18 years, helping them to advance their careers as they made important contributions to HP technologies. He has guided many new hires as they have become high level technical contributors and managers at HP and elsewhere. He has been a member of the HP corporate board that vets and recommends candidates for the positions of Fellow and Senior Fellow since the positions were initiated at HP. He has been a direct mentor to four HP engineers elevated to HP Fellow and three to HP Senior Fellow. He has mentored over 30 graduate student and postdoctoral interns – most of his HP research publications have been in collaboration with young interns. Many of those interns have become permanent employees of HP, and over a dozen others have gone into academic institutions in the US and abroad to become established and well regarded professors in their disciplines and teach what they learned while at HP. Examples are Profs. Yong Chen of UCLA, Jeannie Lau of UC Riverside, Saif Islam of UC Davis, Regina Ragan of UC Irvine, Wei Wu of USC, Nobuhiko Kobayashi of UC Santa Cruz, Dmitri Strukov of UC Santa Barbara and Fatih Yannick of MIT, among many others in the US, Brazil, Canada, England, Germany, Korea and China, several of whom are now sending their students to HP Labs as second or even third generation interns.

**What IEEE positions and other responsibilities has the nominee had in the last five+ years that relate to this nomination?**

Stan Williams gives presentations to IEEE Santa Clara Valley Chapters and to the Silicon Valley Engineering Council, at which occasions High School and University students have been present.

**His CV, biography and overview of published works as well as a complete list of refereed papers published and US patents issued while at HP Labs were attached.**

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## **2015 Outstanding Engineering Manager: Luu Nguyen**

Supporting information:

Dr. Luu Nguyen's lasting and most visible contribution to the outside world has been his non-stop evangelization of the Micro SMD wafer level package. Working closely with Nokia in the late 1990s to address technical issues - from design, manufacturing, assembly, to reliability - the package went from a new and unproven technology to a high volume runner. It set up in the process an industry trend for wider usage of wafer level package configurations in portable applications. In addition, he was the technical lead responsible for guiding the strategy to switch from tin-lead to lead-free packaging at National Semiconductor (before acquisition by TI), and from halogenated to green materials. He was the Principal Investigator for a dozen multi-million dollar programs funded by DARPA, the U.S. Air Force, NIST, and Sematech for development of a wide variety of packaging topics from innovative low cost bumping, low-cost substrate manufacturing, enhanced mold compound formulation, wafer level underfill, package popcorn prediction, and MCM large format assembly equipment. Furthermore, he has also interacted extensively with over 30 universities (U.S. and overseas) and consortia, providing technical guidance on programs funded by both TI/National and the Semiconductor Research Corp., and mentored over twenty students. Finally, at National Semiconductor, he was part of a select group developing a program to foster professional development, practical training, best practices sharing, mentoring, cross-training, and e-learning among more than 2,500 National's engineers worldwide.

### **What IEEE positions and other responsibilities has the nominee had in the last five+ years that relate to this nomination?**

He currently serves as the vice-chair and Fellow Nominator for the SCV Section's Components, Packaging and Manufacturing Technology (CPMT) Society's Chapter.

Prior to the most recent 5 years, he served as treasurer for the chapter. He supervised the application that resulted in the first Chapter of the Year award from the CPMT Society.

### **What specific significant or distinguished contributions or achievements made you decide to submit this nomination?**

Dr. Nguyen's long and accomplished contributions to the profession and to the advancement of IC packaging technology.

Luu Nguyen's lasting and most visible contribution to the outside world has been his non-stop evangelization of the Micro SMD wafer level package. Working closely with Nokia in the late 1990s to address technical issues - from design, manufacturing, assembly, to reliability - the package went from a new and unproven technology to a high volume runner. It set up in the process an industry trend for wider usage of wafer level package configurations in portable applications. In addition, he was the technical lead responsible for guiding the strategy to switch from tin-lead to lead-free packaging at National Semiconductor (before acquisition by TI), and from halogenated to green materials. He was the Principal Investigator for a dozen multi-million dollar programs funded by DARPA, the U.S. Air Force, NIST, and Sematech for development of a wide variety of packaging topics from innovative low cost bumping, low-cost substrate manufacturing, enhanced mold compound formulation, wafer level underfill, package



popcorn prediction, and MCM large format assembly equipment. Furthermore, he has also interacted extensively with over 30 universities (U.S. and overseas) and consortia, providing technical guidance on programs funded by both TI/National and the Semiconductor Research Corp., and mentored over twenty students. Finally, at National Semiconductor, he was part of a select group developing a program to foster professional development, practical training, best practices sharing, mentoring, cross-training, and e-learning among more than 2,500 National's engineers worldwide.

**Wafer Level Packaging:** The technical challenges involved with the 1998 introduction of this wafer level package (WLP) were: form factor for optimized reliability (passivation opening, under bump metallization (UBM) coverage, repassivation material, solder ball size, light sensitivity, chipping during dicing), testing of bumped dies, handling and surface mount, rework, board level reliability (thermal cycling and drop testing), and customer acceptance. From initial process development, engineering evaluation and qualification, he interacted closely with Nokia Research and Helsinki University of Technology (HUT), before, throughout, and after his Fulbright fellowship in Finland, to facilitate better understanding of the complex relationship between WLP design, manufacturing, and reliability. Collaboration included visits to the Nokia Salo phone manufacturing line to witness firsthand assembly issues (line tours were highly restricted), sharing information on board level reliability equipment, test methodologies, results, and joint planning of experiments for faster package qual. In the process, he defined two research projects with HUT that were funded by National Semiconductor over a 6-year period to help Nokia evaluate the performance of high pin count Micro SMD, the influence of board types, finish, component layout, UBM types, and use conditions in drop test and thermal cycling. Further work on process conditions highlighted the characteristics of solder ball interconnects and skin effects of tin oxide on the joints for high speed applications. This close partnership between National, Nokia, and HUT strengthened Nokia's confidence in the Micro SMD package. It set the *de facto* standard and pace for WLP development for low to medium I/O devices, which constitute the highest volume runners in the market for National and the analog industry at the time. His paper introducing the Micro SMD to the industry won **"Best of Session Award" at IMAPS (1998)**. He extended the Micro SMD to a larger family of products, enhancing the reliability of the packages with the introduction of larger solder ball sizes and passivation openings, lead-free solder WLP, wafer level underfill, and polymer core solder balls. His paper on underfill application in wafer level packaging won a **"Best of Conference Award" at the 27<sup>th</sup> IEEE IEMT Conf. (2002)**. He spearheaded the introduction of Microfil, a WLP with a pre-applied underfill, leveraging funding from a 3-year NIST Advanced Technology Program grant. The Microfil marked the first volume introduction in the industry of a WLP with wafer level underfill. Subsequent work with the polymer core solder ball led to the introduction of the Micro SMDxt, with further enhancement in board level reliability and electromigration performance of the WLP.

**Lead-Free Implementation:** The technical challenges included: finding the "best" cost-effective lead-free plating solution, whisker mitigation of matte tin finish, assembly and reliability, long-term storage, backward and forward compatibility (mix and match of tin-lead and lead-free parts during assembly), dual inventory, alignment with subcons, tracking, and transition plans. He served as the technical lead within National Semiconductor for 3 years



(1999-2002), and was responsible for guiding the strategy to switch from tin-lead to lead-free packaging. This activity involved benchmarking the lead-free status and infrastructure readiness, investigating various lead-free options in terms of plating, plating process stability and speed, solderability, board assembly, board level reliability, qualification of a dozen subcontractors used by National, and establishing the IT logistics for tracking standard and lead-free parts. Through his efforts, National made a successful and rapid conversion from standard tin-lead to matte tin plating for its portfolio of thousands of different part numbers, and was one of the earliest industry showcases of successful lead-free implementation. His paper summarizing the effort won **“Best of Session Award” at the 27<sup>th</sup> IEEE IEMT Conf. (2002)**.

**Halogen-free (HF) implementation:** The technical challenges were: HF performance (moldability, interfacial adhesion, reliability) comparable or better than that of standard compound, timely conversion to meet WEEE (Waste of Electrical and Electronic Equipment) directive of 12/2006. As team leader, he subsequently led the evaluation, qualification, and conversion of molded plastic packages from standard epoxy to “green” (halogen-free) mold compounds (2004-2006). The company-wide effort involved benchmarking competitors, customers, and subcons readiness, developing qual programs for different packages, running multiple DOEs (Design of Experiments) of material/device/package combinations, introducing a PCN strategy for different customers, expanding quals for automotive needs, determining impact to the customers, and addressing material inventory control issues. He worked closely with a mold compound supplier to evaluate different formulations to minimize gate leakage issues for automotive applications.

**Thermal/Mechanical:** The technical challenges were: no rapid way to estimate the thermal metrics of a given package; long lead times for thermal measurement and modeling. Luu Nguyen led the development and implementation of a web-based Package Thermal Calculator, reducing the time for evaluating package thermal parameters from weeks of actual thermal measurements or simulation down to seconds. For a given die size, the tool estimates key thermal parameters such as Theta JA, Theta JC, Psi JT, and Junction Temperature for a package mounted on either a 2- or 4-layer JEDEC board. Introduced since May 2005, the tool has been accessed over 10,000 times by designers, product engineers, field apps engineers, customer quality engineers, and packaging engineers throughout National Semiconductor (before the TI acquisition). This effort was described in a paper and was recognized by a **“Best of Session Award” at IMAPS (1998)**. A number of assembly subcontractors such as Amkor, ASE, and SPIL have developed their own internal thermal calculators based on variants of National’s model.

**External Leveraging:** Between 1990 and 2000, electronic packaging was considered as a key enabler for the U.S., and a number of national initiatives were created to establish a domestic based infrastructure. Competition was fierce for the scarce funds, with success rate typically in the low 20%. Luu Nguyen was the program manager, co-PI, and PI on 12 programs sponsored by DARPA, DoD, Air Force, Sematech, and NIST (see list), and functioned as the interface with external organizations and funding sources. He wrote all the technical proposals, highlighted the challenges to be addressed with proposed solutions on a wide variety of packaging topics from innovative low-cost bumping, low-cost substrate manufacturing, enhanced mold compound formulation, mold flow modeling, wafer level underfill, package popcorning





prediction, and MCM large format assembly equipment. He pulled together multi-industrial and academic teams to fulfill the different skill sets needed for each program. The programs accounted for a total of \$56M in cost-shared funding over 7 years, were all successful in meeting their challenging technical milestones, as highlighted by the external award recognition and funding level attracted.

- “Novel High Performance Wafer Level Reworkable Underfill Materials for Flip Chip Packaging” (NIST ATP) - 1999-2001.
- “High Performance Underfill Encapsulant for Low-Cost Flip Chip MCM Packaging: Materials, Processes, and Reliability” (DARPA) - 1996-1999.
- “CAD-Based DFM Tool for Low-Cost Plastic IC Encapsulation” (DARPA) - 1996-1999.
- “Plastic Packaging Consortium” (DARPA-Technology Reinvestment Project) - 1995-1998.
- “Low-Cost Flip Chip Consortium” (DARPA-Technology Reinvestment Project) - 1995-1998.
- “Low-Cost BGA Equipment Enhancement” (SEMATECH) - 1995-1996.
- “70 um Wirebonding” (SEMATECH) - 1995-1997.
- “Technology and Productization Acceleration of Low-Cost Aluminum Nitride Electronic Packaging” (DARPA-TRP) - 1995-1996.
- “MCM Assembly Equipment” (DARPA) - 1994-1996.
- “An Expert System for Design of Plastic IC Packages Against Latent Moisture-Induced Defects” (Wright Patterson AFB) - 1994-1997.
- “Breakthrough Production Capability for MCM-D” (DARPA) - 1995-1997.
- “Plastic Packaging Availability Program” (Defense Logistics Agency) - 1992-1995.

**Developing Talent & Facilitating Tech Transfer:** Luu Nguyen has supervised over twenty graduate students (from UCLA, Purdue, U. Mass, MIT, SUNY Binghamton, GIT, University of North Texas, Auburn, and SJSU) and mentored a number of TI packaging engineers working on the various external contracts. Students worked as repeat summer interns or part-time employees over the school year, and learned many practical topics not taught in school. For the packaging engineers, the opportunities gave them useful experience on addressing advanced packaging challenges that actually dictated the ITRS (International Technology Roadmap for Semiconductors) assembly and packaging roadmap (e.g., flip chip/substrate pitch, laminate stack-up, leadframe adhesion treatment, underfill strengthening, wafer level underfill processing, compound properties, etc.), interacting with peers, and assimilating new skills. His intensive work with a number university programs in the SRC (Semiconductor Research Corp.) Consortium (UCLA on electromigration; SUNY on board level testing; Purdue on solder joint reliability prediction) led to the **2003 Mahboob Khan Outstanding Mentor Award** in recognition for contributions to student mentoring, research collaboration, and technology transfer.

He currently is the Technical Advisory Board (TAB) representative of TI in the Interconnect & Packaging Sciences of SRC, interacting with over 35 universities (US and overseas), providing technical guidance on selected research projects, and coordinating the mentoring activities of about 20 TI employees acting as liaisons to universities with research projects deemed critical to TI needs.

In addition, he is also actively mentoring research programs at four universities in a diverse range of topics:



- Auburn: “Characterization, Modeling, and Mitigation of the Impacts of Mechanical Stress on the Performance of Precision Analog Devices”
- Auburn: “Root-Cause Leading Indicators for High Propensity of Defects and Pre-mature Failures”
- Auburn: “High Temperature Plastic Packages”
- U. Bologna (Italy): “Modeling of Package Influences on High-Voltage Semiconductor FETs”
- U. North Texas: “Thermally Stimulated Current Evaluation of Molding Compounds Used in High Voltage Applications”
- U. North Texas: “Boron Nitride Thermally Conductive High Temperature High Dielectric Strength Interface Materials”
- Arizona State: “Scaling of Inductors Towards 50 micron Size Through Integration of Improved Magnetic Materials”

Previously at National Semiconductor, he was involved with an Engineering Council (2002 to 2011) to develop a comprehensive program to foster professional development, practical training, best practices sharing, mentoring, cross-training, and e-learning among more than 2,500 National’s engineers worldwide. The courses covered a wide range of areas from analog design, signal integrity, ESD, packaging, and test. He organized a yearly series of invited external speakers to discuss a range of packaging topics (embedded, 3D, TSV, package popcorning, packaging stresses, packaging reliability, electromigration, flip chip, fine diameter Au bonding, power electronics, MEMS packaging, DfR, and packaging in harsh environments). He spearheaded the awards nomination of National Semiconductor for these activities, and the efforts were recognized by the **IEEE Educational Activities Board Employer Professional Development Award (2005)**, the **IEEE Region 6 Outstanding Corporate Engineering Community Service Award (2006)**, and the **European Electronics Industry Awards Elektra “Investing in People” Award (2006)**. In 2007, National Semiconductor was runner-up on the Electronic Product Design (UK) e-Legacy “Investment in Training Award” for most innovative company training scheme and/or program, and the e-Legacy “Investment in Education Award” for the investment in the next generation of electronics engineers.

**Participation in IEEE and other professional organizations:** Luu Nguyen has been active in a number of professional societies (IEEE, ASME, IMAPS, SMTA, SPE, and SEMI) over the years. Involvement covers organizing, soliciting/reviewing papers, and chairing/co-chairing sessions in IEEE-sponsored technical conferences such as ECTC (Electronic Components and Technology Conf.), IEMT (Int. Electronics and Manufacturing Technology), PhoPack (Photonics Packaging), IMAPS (Int. Microelectronics and Packaging Society) Conferences and Technical Workshops, and IRPS (Int. Reliability Physics Symp.). He was actively involved with IEEE and ASME Transactions and Journals, as well as Guest Editor and Associate Editor. He served as the Chair of IEEE TC-18 (Technical Committee on Wafer Level Packaging) for 2 years, running (jointly with Georgia tech) successful workshops on wafer level packaging technologies.

At the local IEEE CPMT Santa Clara Chapter level, he has been the Senior Member Development Chair for four years. He was the Treasurer for 3 years, handling the Chapter’s finances, and coordinating the 20+ professional technical and non-technical courses offered yearly by the Chapter. Such courses were quite successful over the years, providing 4-digit



annual income, and help to support other activities benefiting the Chapter's members. Linkage was leveraged with organizations such as SEMI (Semiconductor Equipment and Materials Int.), LEOS (Laser and Electro-Optics Society), SID (Society for Information Display), and MEPTEC (Microelectronics Packaging and Test Engineering Council). Such activities led to the best Chapter of the Year Award in the SCV Section in 2011 for the CPMT Chapter. He currently serves as the vice-chair of the SCV Section's Components, Packaging and Manufacturing Technology (CPMT) Chapter.

**His CV, biography, list of published works, US patents, and list of awards received were attached**

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### **Outstanding Educator**

To honor IEEE members, current University or pre-University classroom teachers who have inspired an appreciation and understanding of Mathematics, Science and Technology and the engineering process in their students, and who have encouraged students to pursue technical careers.

Strong involvement with pre-university initiatives including class visits, Future City, TISP, SMART, MATH COUNTS, First programs, Science Olympiad, or IEEE Student Branches also count for this award.

This is the only Region 6 award that may be given to an individual who is not an IEEE member. Therefore the nomination form question about IEEE positions and other responsibilities might not be applicable.

### **Examples of Prior Winners**

#### **2014 Outstanding Educator: Mohamed El-Sharkawi**

Supporting information:

Professor El-Sharkawi is an IEEE fellow and a distinguished educator at University of Washington. The nominee has over 35 years of experience in teaching various aspects of Electrical Engineering. He taught a large number of graduate and undergraduate courses at the University of Washington. They include Electric Energy, Renewable Energy, Wind Energy, Electric Safety, Intelligent Systems and Applications, Power Electronics, Power Quality, Energy transmission, Power System Analysis, Distribution Systems, Electric Circuits, Dynamics & Control of Power Systems, Transient Analysis of Power System, Elements of Electrical Engineering, and Advanced Electric Drives. He also supervised numerous master and doctoral theses, independent studies, independent research, and special projects. In addition to the regular university classes, he taught short courses (20-40 hrs.) to professionals all over the world in a number of subjects. Among the courses that are related to the proposed Fulbright visit are Modeling of Wind Turbine Generators, Wind Variability and Balancing Areas, Wind Energy Reactive Power and Voltage Control, Fault Ride-Through in Wind Farms, Automatic



Generation Control, Wind Integration into Utility Systems, Energy Forecasting in a Competitive Electricity Market, and Artificial Neural Networks for Electric Load Forecasting. In addition, the Nominee along with Professor Bose from Washington State University have developed an extensive educational program for power engineers on several subjects. The courses include 6 undergraduate and 12 graduate courses that are offered on-line at <http://SmartGridProgram.org> Each of these courses is 4 credits. Over 1000 engineer have taken at least one of these classes during the last 3 years.

Besides the teaching activities, the nominee published the following four textbooks:

- “Electric Energy: An Introduction,” Third Edition, CRC Press
- “Electric Drives,” Cengage Press
- “Electric Safety: Practice and Standards,” CRC Press
- “Wind Energy: An Introduction,” CRC Press.

The Nominee has established a teaching modality that is suitable for the new generation of undergraduate students. He relies on cognitive learning that includes knowledge, comprehension, and application to emphasize the subject and to make it relevant to the students through real-world cases. For graduate level classes, the cognitive learning includes analysis, evaluation, and synthesis. With evaluation, the students can sharpen their skills on how to judge, critique, justify, argue, and recommend a technology. With the synthesis, the students learn how to invent, predict, design, and improve on a technology.

He also often hosted tours of his lab for local middle and high school students to inspire them become engineers or pursue other STEM careers.

**What specific significant or distinguished contributions or achievements made you decide to submit this nomination?**

The nominee has extensive teaching experience for over 35 years

1. The nominee taught a wide range of courses
2. The nominee supervised a large number theses and projects
3. The nominee taught a large number of professional short courses
4. The nominee developed on-line courses on smart grid that are available to the engineering community free of charge.
5. The textbooks that are published by the nominee and used by universities worldwide.
6. The effective teaching modalities of the nominee at the university of Washington
7. The instructional labs that he designed and implemented at the University of Washington

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**2015 Outstanding Educator: Hannah Robinson**

Supporting information:

Hannah Robinson has been at La Reina High School, an all-female student college preparation school in Thousand Oaks, since 2007 as science teacher, teaching classes that have included Biology, Life Science, Science Research, Anatomy & Physiology, and Algebra 1, and as the Science Department Chair since 2013. The young women who went on to enter an engineering college program think back to Ms. Hannah Robinson’s influence in their life. In Ms. Robinson’s mind, science can be taught in a variety of exciting ways to catch the attention of the student



and trigger their interest, and all students can be fascinated by STEM (Science Technology Engineering and Math). During her tenure, the Thousand Oaks school was awarded a National Blue Ribbon Award from the Department of Education based on various metrics including math SAT scores. With the leadership of the administration, she was instrumental in the decision to adopt eight Next Generation Science Standard practices, and introduce engineering modules developed by the Infinity program. This transition resulted in the first formal teaching of engineering at La Reina. This, plus her creative approach of aligning students' interest with the scientific material, combined to make her an asset to a school seeking to be relevant to girls in the 21st century.

Ms. Robinson's impact is woven into the school's success. After she took over the AP Biology class, declining College Board scores were turned around, increasing about 20% in the first year and about 20% more in the second year. Math SAT scores at La Reina High School surpass state and national averages by 40 to 50 points. Nearly 100 percent of the seniors enter college and many of these young women are welcomed at prestigious schools such as MIT, Harvard, UCLA, and USC colleges of engineering. The school received the 2015 Region 6 IEEE pre-university outstanding school award for its STEM initiatives.

Ms. Robinson's journey since she started teaching Science in 2001 has been applauded by head of schools, parents, students, and the community. "I continue to be amazed by the many creative and original ideas you have about teaching sciences" states Fran Scoble, Head of School, at the Westridge High School in Pasadena.

Ms. Robinson received the 2004 RadioShack National Teacher Award for Outstanding Mathematics, Science, and Technology Teachers. Senator Barbara Boxer commended her for mentoring the Science Olympiad team to State level as coach in 2005 and 2006. Ms. Robinson's way of reaching the students is best illustrated by the 2003 Courage Award given to her by her 10th graders, "given to a teacher who dares to be different" at the Milken Community High School in Los Angeles. More recently, one parent wrote: "We know why we are at La Reina: YOU. Thank you from the bottom of our hearts for caring so very much about all of our daughters."

Ms. Robinson's visionary work has emerged from a career that started first with 15 years in the publishing industry developing and marketing educational books to teach computers, math and science. In 2001, she decided to work directly with the students and was invited to teach chemistry at the Milken Community High School in Los Angeles. The prestigious Westridge High School in Pasadena, an all-girl private school, welcomed Ms. Robinson in 2004 as the Earth Science and Physical Science Teacher and in 2007 Ms. Robinson moved to Ventura County and joined La Reina High School.

Ms. Robinson has a Bachelor of Science with Honors in Biochemistry and Physiology, a California Teaching Credential, and a Certificate in Language Acquisition and Development from the California Department of Education.

**What IEEE positions and other responsibilities has the nominee had in the last five+ years that relate to this nomination? *Note that she is not an IEEE member***

Hannah Robinson worked with the administration of the La Reina High school to change the breadth and depth of the STEM education at La Reina to establish excellence. The goals were:



1) give the girls a stronger and broader exposure to the biomedical, engineering, and technical fields

2) eradicate the limiting belief that males are better fit for technical careers, and

3) educate and encourage girls to apply to top engineering and science colleges and/or those that welcome students with a strong set of techniques in STEM inquiry skills gained while at La Reina.

- Ms. Robinson helped the school deploy revolutionary approaches to teaching STEM, including the use of technology in learning. Ms. Robinson piloted the *one-to-one iPad program* for a year in advance of a very successful school-wide rollout, during which time science scores increased. Currently all students are given an iPad to customize the learning to their needs with a more student-centered education. The iPad holds many class books and exercises in digital format and motivates today's students. It also supplements classroom education with digital films and photos illustrating key points, interactive experiments performed with the iPad, and interactive exercises done in class. iPads provide ways for students to film their projects, map their thinking, interact with the teacher, and gain immediate feedback from their teacher.

- Ms. Robinson has undertaken to launch, with the school administration, a more logical way to introduce STEM education to students by replacing 9th grade Biology with a *Physics First* course to create a robust educational platform from which core requirements of Chemistry, and later Biology in 11th grade, are introduced in subsequent years. Physics in 9th grade, taught using themes and student-centered projects, is especially suitable for girls in order to speed their spatial brain development needed for all science and engineering courses. AP Physics and other electives are also available.

- As STEM Coordinator, Ms. Robinson intensified the teaching of STEM education by integrating more math in science classes, helping make a decision to introduce Infinity STEM engineering program modules to 8th grade Physical Science (taught by others), and added a range of biotechnology labs she taught including gel electrophoresis, DNA fingerprinting, live bacterial transformation with a jellyfish gene, PCR, and DNA analysis of local Thousand Oaks insects for *Wolbachia*, a program of novel high school research funded by Cold Spring Harbor.

- Under Ms. Robinson's guidance and teaching La Reina transitioned to an entirely new inquiry-based College Board Pre-AP and AP Biology framework. Biology provides a thorough understanding of molecular, cellular, evolutionary, human, and ecological biology. STEM projects take the form of extended lab time to plan and conduct in-depth experiments, to develop critical thinking skills, and analyze scientific evidence. Investigations include hands-on biotechnology activities, studying genetics using Fast Plants and DNA evidence, exploring ecology and energy flow using butterflies, and simulating evolution of the Galapagos Islands.

- In Anatomy & Physiology, Ms. Robinson introduced case studies to the teaching of science reasoning skills, and the students explore the human body this way plus through lecture, plus investigative and interactive projects, iPad apps, and concept building activities. The students are invited to use new relevant software applications to present their findings and results. Investigative labs explore why isotonic saline is used in IV drips, how to measure lung capacity, and how to analyze the spread of disease by epidemiology. STEM projects help students refine their skills in using evidence to engage in argument. Topics include the major body systems: circulatory, nervous, digestive, skeletomuscular, immune, endocrine, and reproductive.



• Ms. Robinson created and launched the Science Research elective, a high school lab class that develop skills in research topic identification, science literacy, scholarly document and web research, field and lab research methods, scientific writing, and oral presentations. Students who elect to intern with an engineering or science research mentor at a local college, university, or industry over the break of the sophomore or junior year are expected to read research papers in order to identify a potential mentor, and work independently with their mentor. La Reina STEM Summer Interns from this program included EPIC mechanical engineering at Cal Poly San Luis Obispo, Artificial intelligence at JPL in Pasadena, Discovery Center for Science & Technology, Astronomy Laboratory at Pepperdine, Biophysical nature of tumors at UCLA, Microelectromechanical systems at USC, Research on *E. coli* bacteria at UCLA, Equine veterinary hospital, Simi Valley, Los Robles Hospital, Health Clinic medical doctor shadow, Community Memorial Hospital surgery observation.

• This vision expands in 2015 with the introduction of the research-based integrated science program selected by Ms. Robinson to increase confidence and maintain enthusiasm for science across the Middle School grades, "*Project Based Inquiry Science*" incorporating STEM and Next Generation Science Standards in all 6-8<sup>th</sup> grade science classes.

Ms. Robinson has become a local expert in the Ventura County on leveraging the use of mobile platforms such as the iPad to accelerate the learning of STEM education. The Office of Education collaborated with Computer Users in Education and invited her to present *Flipped Teaching with iPads in the Blended Learning Cycle*

**What specific significant or distinguished contributions or achievements made you decide to submit this nomination?**

- 2013 blue ribbon awarded high school for revolutionizing education through introduction of technology and enhanced programs
- Alignment with the new College Board Standards for Science Success
- SAT scores significantly above state and national averages
- Modern and relevant STEM courses and enrichment opportunities available to students.

**A resume was attached**

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