

CAL POLY
AERONAUTICAL ENGINEERING
DEPARTMENT NEWSLETTER

SPRING 1996

Aeronautical Engineering Department
California Polytechnic State University
San Luis Obispo, CA 93407
(805) 756-2562

MESSAGE FROM THE DEPARTMENT CHAIRMAN

In the circle of alumni from the 1960s to the 1990s who attended the first L.A. Alumni Reception of the College of Engineering at TRW last December, I was surprised to notice that almost all recent graduates are working in the commercial space industry. That snapshot was accidental. But it shows a fundamental shift in the aerospace industry in the past several years. Actually, for the same reason, the department has started a spacecraft design class – now, we are one step closer to ‘space’.

Meanwhile, facing the public’s concern about the educational quality and productivity, and the vulnerable budget for higher education in California, Cal Poly is also preparing for a fundamental change. The change will be based on the Cal Poly Plan, a plan that was developed last year and is now undergoing intense discussion on campus. Through this plan Cal Poly will become a state-assisted institution, instead of the traditional state-supported institution. It will have a financial structure different from the rest of the CSU campuses and will have a new set of measures to ensure institutional quality, accountability and productivity.

Despite all these changes, the department still has one of the finest undergraduate aeronautical programs in the nation, a proud heritage shared by all of us. As in the previous year, the faculty have been very productive; they are recipients of various honors and awards. The students of AIAA, Sigma Gamma Tau, and the Aircraft Design Lab have been active as well. We keep receiving generous support from our alumni, parents, and the aerospace industry. The F-104 received from NASA-Dryden and the quarter-million dollar support from Northrop Grumman to facilitate the Aerospace Systems Lab in the new NSF-supported Advanced Technology Laboratories building are especially appreciated (see inside for more information on these donations).

Thanks to the outstanding performance of many of you in the aerospace industry, the department has enjoyed a fine reputation around the nation decade after decade. In a time of change, I hope, this will be the constant.

Jin Tso
Department Chairman

FACULTY UPDATE

Dan Biezad has been developing two new laboratories (Flight Simulation Lab and Aero Controls Lab) for undergraduate education, senior projects, and student research. In addition, he has initiated a new NSF-funded Mobile Aerosystems Test Laboratory (MAST) to integrate engineering design disciplines into a roadable-aircraft with functioning avionics system. Dan is also working on the development of an NASA Dryden-funded internet-based source of aeronautical systems projects from NASA and the aerospace industry that would be suitable for use by high school teachers in lesson plan development and in motivational project development for their students. Dan has published six technical papers during the year: "Computer Assessment of Fighter Design", "The Roadable Aircraft Design Project", "Development of an Agility Assessment Module for Preliminary Fighter Design", "Computer Optimization of Handling Qualities During Preliminary Design", "Rotorcraft Flight Control Design Using QFT and Dynamic Crossfeeds", and "Developing a Workstation-Based, Real-Time Aircraft Simulation for Rapid Handling Qualities Evaluations During Design."

Russell Cummings has co-authored four AIAA technical papers this year: "Analysis of the Elements of Drag in Three-Dimensional Viscous and Inviscid Flow", "Experimental Investigation of a Circular Cylinder Under the Effects of Tangential Slot Blowing", "A Parametric Study of Supersonic Laminar Flow for Swept Wings Using Linear Stability Analysis" and "Computational Investigation of a Part-Span Flap." In addition, he co-authored four journal articles in *Computers and Fluids* and the *Journal of Aircraft*: "Supersonic, Turbulent Flow Computation and Drag Optimization for Axisymmetric Afterbody", "Tangential Slot Blowing on a Generic Chined Forebody – Computational Investigation", "Tangential Slot Blowing on a Generic Chined Forebody – Experimental Investigation", and "Wake Integration to Predict Span Loading from a CFD Solution." Russ also completed a rewarding sabbatical leave at Oxford University, and is returning there this summer to continue working on a wing/engine optimization design project.

Jon Hoffmann will be on Sabbatical leave during the 1996-97 academic year, working with The Orvis Company on a fly rod design study. The faculty are preparing for a stampede of students signing up for the Aerothermodynamics course sequence during Jon's absence.

Jin Tso has co-authored two experimental reports with NASA Ames this year: "An Experimental Investigation of Flow-Induced Oscillations about the B&K In-Flow Microphone" and "Suppression of Dynamic Stall by Steady and Pulsed Upper-Surface Blowing." He presented a paper entitled "Developing Region of a Hot Subsonic Jet in a Crossflow" at the AIAA 34th Aerospace Sciences Meeting in Reno, NV, in January. He has also completed assembly of the department's new water tunnel, which is currently being used for a ground vortex study of STOVL aircraft.

NORTHROP GRUMMAN DONATION

The National Science Foundation has awarded Cal Poly's College of Engineering a grant to construct a new applied engineering research facility. Cal Poly was the only primarily undergraduate university to receive such a grant. One of the requirements of the NSF grant is that matching funds be obtained for the building and its equipment. The Aeronautical Engineering Department is planning to have a laboratory in the new building called the Aerospace Systems Laboratory, which will house computational resources for students working on controls, flight simulation, structures, design, and computational fluid dynamics. The Northrop Grumman Corporation, through the help of alumni Bob Wulf, has committed to supporting the Aerospace Systems Lab by contributing \$250,000 to the research facility. This donation will insure that Cal Poly students will be able to perform high quality computer/systems research into the 21st century.

NASA DONATES F-104

Cal Poly is the only university in the state to receive a donation of an F-104 aircraft from NASA. Our current and former Industrial Advisor Board members from Dryden Flight Research Center, Ted Ayers and???, helped to secure the aircraft for the department. The airplane is shown here as it was unloaded near the Hangar. Dr. Dan Biezad has planes to use the aircraft as an "Iron Bird" in conjunction with the Flight Simulation Lab. In addition, students studying supersonic aerodynamics are using the aircraft as a case study for the design of high-speed aircraft.

NEW DEPARTMENT SECRETARY

The Aeronautical Engineering Department is proud to have a new secretary, Dena Ross. Dena comes to the department from Cal Poly's Student Academic Services office, where she was the office manager. We look forward to having Dena become the newest member of the department team. Stop by and introduce yourself if you are in the San Luis Obispo area.

STUDENT NEWS

AIAA Region VI Student Conference – The 1996 AIAA Region VI Student Conference was held at Cal Poly March 27-30. Students from around the western U.S. traveled to San Luis Obispo to participate in the conference, including the University of Washington, Utah State University, Brigham Young University, University of Nevada at Las Vegas, Embry-Riddle Aeronautical University, San Diego State University, the University of Southern California, California Institute of Technology, Cal Poly Pomona, San Jose State University, and Cal Poly. Students attending the conference had to submit a technical paper, which was judged by engineers in industry – they also had to make an oral presentation of their technical work. The student chairman of the conference was Tobias Panek, who was helped by a hard-working group of students who made the conference a great success.

AIAA Individual Aircraft Design Competition – Aeronautical Engineering senior Paul Hans Fecht won the AIAA United Technology/Pratt & Whitney Undergraduate Individual Aircraft Design Competition with his design of a Formula One pylon racer aircraft. The project advisor was Robert van't Riet.

AIAA Team Aircraft Design Competition – Cal Poly seniors were awarded second and third place this year in the AIAA Lockheed Undergraduate Team Aircraft Design Competition. The students prepared a detailed preliminary design of an air launched space transportation system. The second place design team included Craig Woolston, Jon Burningham, John Cino, David Gurchinoff, John Schoorl, Johnny Chao, Tim Gresham, Delia Reyes. The third place design team included David Margrave, Tony Lytle, Cho Cao, Greg Brinton, Paul Lancaster, Matt Lehman, Gabe Hagerty, and Veronica Soria. The project advisor for both groups was Robert van't Riet. This year's students are working on the design for a high endurance, high altitude reconnaissance aircraft.

AIAA Outstanding Student Branch – the Cal Poly AIAA student branch was named the Outstanding Student Branch within Region VI (western U.S.) for the 1994/95 academic year.

AERO NEWSLETTER QUESTIONNAIRE

Dear AERO alumni and friends: We would like to have your input on your experiences at Cal Poly and in the real world. We will use the results of this survey to insure that Cal Poly continues to offer a hands-on education to the students of the future.

1. What year did you graduate from, or leave, Cal Poly: _____
2. What is your general attitude toward the Aeronautical Engineering Department (score on a scale of 1 to 5; 1=poor, 5=excellent)? _____
3. What is your general attitude toward Cal Poly (1 to 5)? _____
4. How do perceive that others (peers, colleagues, employers) feel about the quality of your education at Cal Poly (1 to 5)? _____
5. How many years were you enrolled at Cal Poly? _____
6. How would you rate the general education courses required for your degree (1 to 5)? _____
7. How would you rate the math/science/chemistry courses required for your degree (1 to 5)? _____
8. How would you rate the engineering support courses required for your degree (1 to 5)? _____
9. How would you rate the Aeronautical Engineering courses required for your degree (1 to 5)? _____
10. How would you rate the faculty of the Aeronautical Engineering Department (1 to 5)? _____
11. How would your rate the labs and facilities of the Aeronautical Engineering Department (1 to 5)? _____
12. Please evaluate each of the following in terms of their degree of importance in your career (1 to 5):

Technical knowledge _____	Math/Science knowledge _____
Writing skills _____	Oral communication skills _____
Computer skills _____	Management/business skills _____

13. Rate how well Cal Poly prepared you for each of these items:

Technical knowledge _____	Math/Science knowledge _____
Writing skills _____	Oral communication skills _____
Computer skills _____	Management/business skills _____

14. Compare your preparation for each of these items with the preparation of graduates from other colleges or universities:

Technical knowledge _____	Math/Science knowledge _____
Writing skills _____	Oral communication skills _____
Computer skills _____	Management/business skills _____

15. Feel free to make any comments about Cal Poly and/or the Aeronautical Engineering Department:

HONORED ALUMNI

Robert “Hoot” Gibson was named the recipient of the Aeronautical Engineering Medallion Award for 1996. The College of Engineering has instituted the award as a way of helping each engineering department to honor distinguished alumni. “Hoot” graduated from the department in 1969 and is currently the Assistant Division Chief for Space Flight operations at NASA Johnson Space Center. Last year “Hoot” made history when he commanded the first flight of a Space Shuttle in a docking mission with the Russian Space Station Mir. “Hoot” has been a great supporter of the department and Cal Poly over the years. Thanks for everything “Hoot”!

MORE ALUMNI MEMORIES

Many of you helped in identifying the people in the picture with Amelia Earhart. According to Howard Wilson, Ben Shirley, Dave Hoover, Louis Barr, and Roy Moungovan the people are (from left to right): M.C. “Marty” Martinsen, Paul Mantz, Phil Jensen, Amelia Earhart, and Harley Smith (although the identity of the last person in the photo was the one that resulted in the most guesses, including: Harley Smith, Tony Stam, and “Winkie” Hollister).

Howard Wilson went on to say that, “the Curtiss “Junior” that Ben Shirley mentioned in his Alumni Memories originally belonged to Maurice and Meryle Rush (Class of 1937 I believe). We in the class of 1936 also rebuilt another Curtiss “Junior” owned by Harley Smith. This one we flew from Art Madonna’s airport located across Edna Road from Clark Field. The present airport at San Luis Obispo was founded by Chris Hoover (Class of 1936), Dave Hoover (Chris’ younger brother, Class of 1939), and Earl Thomson (their brother-in-law).

Here’s some more news about the Curtiss “Junior” which Ben Shirley spoke of in the last newsletter. We have recollections from two of our alumni:

These memories are from Roy Moungovan, Class of 1941: “I thought you might like to hear a bit more about [the] old Curtiss Jr. The registration showed it owned by Wm. Lincoln (who I see occasionally at Pan Am retiree gatherings), Sackett, and Rush, if I remember correctly.

“The airplane owed the school \$300 for parts and the school was trying to sell it. For the next couple of years the airplane sat in one of Fred Philbrick’s hangars while the engine was at Cal Poly [being overhauled]. Before I left in 1941 the engine was back and it was flown a few times. In ‘38 and ‘39 Fred operated his 1929 J-5 Stinson and a Rearwing Sportster while ex-Polyite Ed Lauppe operated a Great Lakes and an Aeronca K.

“One time in late ‘39 or early ‘40 we had a long weekend and Fred, son of Clyde, Harold Gibson, and I were all out at Clark Field on Friday (Lauppe had moved to Santa Barbara to fly for Bert Bundy). We were kicking around what we would do when someone jokingly suggested that we ought to get a rope, tie the Junior behind the Stinson and fly it as a glider. We all laughed, and a moment later someone said, ‘Why don’t we tow the Jr. behind Gibby’s hotrod as a glider?’ We laughed again until someone said, ‘I wonder if it would work?’ Fred spoke up, saying, ‘There’s a rope in the next hangar.’ At that someone said, ‘Mebbe we better not; if we bust it up Mart would have a fit. The school still hopes to get \$300 out of it.’ Said Fred, ‘If Mart complains I’ll tell him that it owes me more than \$300 in hangar rent.’

“We adjourned to the next hangar where the Junior sat forlornly, minus its sickly Szekely. The gas tank (half full) and motor mount were still aboard, with the tach drive, gas line, mag wire, etc., hanging loose. We wondered about the C.G., but since the engine was only a little aft of the C.G. we figured that at worst it would tend to be a bit nose heavy. Clyde got in the cockpit and we took turns lifting the tail and estimating that it would be all right.

“We found two ropes, one 50 ft. long and the other 100 ft. Tied one end of the short rope to a landing gear strut, pulled it out to the front and back to tie it to the other gear strut. We then tied one end of the long rope to the base of the V and pulled the line out to the end of the runway. Clyde advised that he would level off about three feet high and asked me to release the rope when he waved and for Gib to accelerate

out of his way for landing. I knelt on the rumble seat facing aft, and held the rope with both hands. It was agreed that in order to avoid a jerk, Gib would start, and stay, in second gear.

“We got going slowly in second, but soon accelerated. Clyde got off nicely and leveled off while we proceeded down the field till the end approached. He waved, I dropped the rope and pounded on the side of the car; Gibby pulled ahead and off to one side while Clyde landed. ‘Flies great,’ Clyde said. ‘Next time, give it all you’ve got and I’ll climb as high as I can with this rope and wave over the side for you to release me.’ I demurred. “There’s no way I can hold that rope if you pull up. Just pulling you level felt as though my arms were about to pull out of their sockets.’ I suggested that I take a half turn of the rope around one of the rumble seat assist grips and another half turn around a brace alongside the seat. Clyde wasn’t sure that would release properly, but we tried it several times with tension on the rope and each time I release the end it whipped free cleanly.

“Dragged the airplane back to the downwind end of the field for the second run. Clyde pulled up sharply after take-off and climbed until the rope rose at about a 60-degree angle before waving for release. He made a couple more flights and then got his dad in the other cockpit and we pulled both into the air for a couple of flights. After Fred got out Gibby and Clyde exchanged places and Gibby got in several flights. I had less than 5 hours solo at the time and had never even seen the Junior fly, but I was hoping to have a go at it. However, when we dragged it back to the end of the field for the umpteenth time, Fred said, ‘Well Mougy, it’s about your turn, I’d say.’ I got to make three flights in it and enjoyed every second. Unfortunately this was one time I didn’t have my camera with me but it happened just as I’ve described.”

And now here are some remembrances from Dave Hoover, Class of ‘39:

“I was especially interested in Ben Shirley’s letter and photo of Amelia Earhart at Cal Poly. This was in my era of attendance at Cal Poly; in fact I was the photographer of this picture. This picture and several others were taken in the summer of 1936. I was employed in my first job in aviation as a mechanic’s helper at Cal Poly in rebuilding and finishing the Boeing P12 on engine run-up, prior to test flight at Clark Field, San Luis Obispo. I also had a photo of Amelia Earhart and Mart Martinson at the cabin door of her Lockheed Electra. This photo appeared in the 1937 or 1938 Cal Poly yearbook. I lost my negatives of these pictures; they were all taken with a Brownie Box Camera of that era.

“I wish some of the old Cal Poly Aero Alumni would give us a write-up (historical record) of Cal Poly Aero from its inception in 1928 on. I am familiar with it from 1933 on, but am vague on it previous to 1933. My family residence was about three blocks from the Cal Poly campus on Foothill Blvd. In 1933 while I was in high school my mother started a rooming and boarding house for Cal Poly students and catered to Aero Dept. students, as my brother Chris Hoover (Aero ‘36) was into aviation and so was I.

“As I recall Cal Poly’s Aeronautics Department was established in 1928, the year after Lindbergh’s flight across the North Atlantic Ocean and the year after the US Bureau of Aeronautics was established to regulate and oversee aviation in the U.S. The Aero Dept. was formed under the guidance of Glen Warren, manager, and was set up as “Approved Repair Station #84”. A three-year program was set up to train students in the various arts and crafts to become Federally Licensed Aircraft and Engine Mechanics and examinations and test were given by the Department of Commerce at the end of a three-year school period. Monty Montejo assisted Glen Warren. About 1930 Martin C. Martinson (Cal Poly Class of ‘21) came into the Aero Dept. faculty and in 1932 Roy L. Jones came on board as Aero Engines and Drafting instructor. Glen Warren and Monty Montejo left and Mart Martinson was made head of the department. In 1937 Roy Jones left and Roy F. Metz became Aero Engine Instructor and John D. McKellar joined as Aerodynamics and Drafting instructor. We had other Cal Poly instructors for other classes, such as Charles E. Knott for Machine Shop and Strength of Materials. Henry Figge was our Welding instructor and Dr. Bourne Eaton was our Math instructor. Margaret Chase was our English instructor and, of course, Capt. J.C. Duel and Howie O’Daniels were our athletic instructors.

“Myron Angel had it right as one of the co-founders of Cal Poly about 100 years ago when he said, ‘To teach the hand as well as the head.’ Cal Poly Aero Dept. in its early days designed and built several airplanes. The first designed and built by faculty and students was the ‘Glen-Mont’, named after Glen Warren and Monty Montejo. This aircraft as I recall was a four place high-wing cabin monoplane similar in appearance to the factory manufactured Ryan B4 of that era. In 1930 a two-place side-by-side open seating taper wing biplane powered by a Kinner K5 100 HP engine was designed and built. In 1931-32 a

three place hi-wing cabin monoplane was designed and built, known as 'Marty's Cabin Monoplane', powered with a Comet radial engine of 130 HP; this aircraft was similar in appearance to a Curtiss Robin.

"The most interesting of all faculty and student designed aircraft was John McKeller's flying wing. Mr. McKeller had designed and patented a control system for a flying wing aircraft and in 1937-38 a low wing one place, twin engine aircraft powered with two 50 HP Continental engines in pusher and tractor configuration was built. Unfortunately the flying wing was destroyed in a high-speed taxi test and never flew. Perhaps this letter will stir some of the old alumni memories and eventually we can get a complete history of the Cal Poly Aero Dept."

ALUMNI NEWS

If you would like to be included in future newsletters, mail your name, graduation year, and noteworthy information to AERO Alumni Newsletter, c/o Russell M. Cummings, Aeronautical Engineering Department, Cal Poly, San Luis Obispo, CA 93407.

THE THIRTIES

Howard Wilson, Class of '36 – Howard went to work for Lockheed Aircraft in Burbank after graduating, and then joined the Aeronautics Research Lab at Cal Tech. He worked for two years as an instructor at Cal Poly before joining Pan American Airways at Treasure Island, CA. At Pan Am he worked as a mechanic and in engineering maintenance and flight engineering. His job allowed him to see the world, working in San Francisco, Seattle, New York, Los Angeles, and Peru, and he has flown to every continent except Antarctica. After retiring, Howard and his wife moved to Ventura, CA where they are now enjoying life.

George Milne, Class of '38 – George spent over 28 years working with T.W.A. as a maintenance technician, instructor, and foreman. His job allowed him to instruct at Lockheed, Wright-Patterson Engine Factory, AirResearch, Pratt & Whitney, Consolidated Aircraft, Hamilton Standard, and Boeing. George and his wife currently live in Milbrae, CA.

Harley Smith, Class of '38 – Harley currently lives in Springfield, MO, where he has retired after spending 38 years as the Manager of Quality Control at Pan American Airways in San Francisco and New York.

THE FORTIES

Leonard E. Hobby, Class of '40 – Leonard spent the majority of his career with Douglas Aircraft Co. in Santa Monica and Long Beach. He also worked for five years at Ford Motor Company's Aeronautics Division in Newport Beach. He retired from Douglas in 1975.

Ben E. Snow, Class of '40 – after graduation Ben went to work for the U.S. Air Force and Rockwell, where he retired after 37 years. He finished his engineering career as a Lead Engineer for design, hydraulics, and mechanical systems. He is enjoying retirement with a bit of golf, traveling to the British Isles and Hawaii, and works on his painting and wood working hobbies.

Roy Moungovan, Class of '41 – Roy now lives in Sebastopol, CA and helped to identify the people in the Amelia Earhart photograph from the last newsletter.

John S. Ehret, Class of '48 – John worked for Douglas Aircraft Co. from 1948 until 1979, when he joined the FAA, before returning to McDonnell Douglas in 1989. He is currently working on the Low Cost Nacelle Program for the C-17 transport.

August Motmans, Class of '48 – August worked for ten years in the aerospace industry and for 33 years as an industrial technology instructor. He is now retired and living near the seaside in Santa Cruz, CA, where he has achieved national standing in adult masters swimming. He is also involved with the San Martin Aircraft Museum.

THE FIFTIES

William J. Young, Class of '53/'54 – William retired from Westinghouse-Hanford Co. as a Principal Engineer in July 1988 and moved to the Olympic Peninsula of Washington where his wife and he are enjoying the clean, fresh air and scenic beauty of the area. He finds time to travel, bicycle, hike, and work

on his RC airplane models. He would like to hear from any of his classmates (call the department for his address).

Lloyd Birrer, Class of '54 – after being the Captain of the Cal Poly Gymnastics Team, Lloyd was a Design Manager at the Rocketdyne Division of Rockwell International. He worked on the liquid propellant engines for the Atlas ICBM, the Jupiter rocket (which put the first American in Space), the Saturn-Apollo rocket, and the Space Shuttle. Since retiring as Engineering Manager from Rockwell he is keeping busy by exploring the Arctic by kayak and backpack, mountaineering, competitive shotgun shooting, and long distance bicycling. He set out last May on his second solo cycle trip across America at the age of 68!

Robert J. Olivas, Class of '57 – Bob completed 40 years in the aerospace industry, 35 with McDonnell Douglas Corporation. After graduating he went to work for Douglas in Long Beach as a performance engineer working on the C-133. He spent 22 years working in the commercial marketing department developing and selling DC-8, -9, -10, and MD-80 aircraft. Later in his career he worked with Avmark, Inc. in Washington, DC and Lucas Aviation in Santa Barbara, CA, where he was the Director of Marketing. Since retiring, he and his wife have lived in Palm Desert, CA, where they enjoy their grandchildren.

Richard R. Denno, Class of '59 – Richard has worked for the past 16 years with The Aerospace Corporation in El Segundo, CA. He is currently a project engineer responsible for integration of the Centaur upper stage on the Titan launch vehicle. He is planning to retire soon.

THE SIXTIES

Tom Sakata, Class of '60 – Tom has been working at Boeing in Everett, WA for 32 years, where he is currently a principal engineer. Tom says that he is proud of the recent engineers from Cal Poly who have gone to work for Boeing.

THE SEVENTIES

David Esposito, Class of '73 – David has worked for 22 years with Hughes Aircraft Company in El Segundo, CA. He is currently working in advanced spacecraft design, evaluating composite materials for deployable radiators, and supports both government and commercial customers. He is married and has two children.

Alexander Woo, Class of '78 – Alex is working as a financial consultant for the Bank of America in San Francisco, and says that in this changing world you have to be prepared to adapt in order to make a living.

THE EIGHTIES

James A. Caine, Class of '82 – James works for AT&T Wireless, Aviation Communication Division in Seattle, WA. Before that he spent four years as a flight test engineer at Edwards Air Force Base, three years with Pan American World Airway as a Boeing 727 Engineer and two years as a second officer with Delta Airlines. He was married in 1990.

Jeff Jensen, Class of '83 – since graduating Jeff has worked for Kaiser Marquardt where he has developed numerous type of rocket engines for satellites, kinetic kill vehicles, and launch vehicles. He is currently working to increase rocket engine efficiency while reducing cost and weight for future propulsion systems.

Dennis Petersse, Class of '84 – Dennis has worked for 9 years with PG&E, where he is currently a Senior Operations Engineer at Diablo Canyon Nuclear Powerplant near San Luis Obispo, CA. He says, "Congrats to Georgia – I'm sure you'll miss her as we did when we left in '84!"

Marcie (Amnuaypayoat) Cayton, Class of '89 – Marcie and her husband met while working at Rohr Industries in San Diego and were married in September 1994. She worked at Martin Marietta AstroSpace in New Jersey for one year and currently works for McDonnell Douglas Technical Services Company near Seattle. Marcie and her husband are managing the Engineering Forum on the Microsoft Network, and they encourage engineers of all disciplines to visit the on-line forum, contribute ideas, and volunteer for special projects.

THE NINETIES

David H. Whitaker, Class of '92 – after working at Northrop as a structural design engineer on the F-18 E/F, David left the aerospace industry to start his first year at the College of Osteopathic Medicine of the Pacific. He hopes to obtain a residency in emergency medicine or surgery after graduating in 1999.

Manuel Parayo, Class of '93 – Manuel works for Tao Media Group in Fremont, CA where he produces a CD-ROM newsletters for Symantec Corp., which features their latest software developments. He also tests PC video games and performs quality assurance testing on various products.