



Curriculum Vitæ

Dr. Eduardo Cantoral

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Blog: <http://penandtablet.blogspot.com/>

This CV: <http://tinyurl.com/zpl87g4>

Twitter: @EduardoCantoral

CEO of Hands: Pen and Tablet Project

Degrees and academic achievements:

June 1971:

B.S. in Communications and Electronics Engineering.

Instituto Politécnico Nacional. Escuela Superior de Ingeniería Mecánica y Eléctrica (ESIME-IPN). Third best GPA at ESIME-IPN (8.7/10).

(Mexico.)

January 1970 - June 1971:

CANIECE Scholarship. Instituto Politécnico Nacional.

(Mexico.)

July 1973:

M.S. in Physics. Instituto Politécnico Nacional. Departamento de Física. Centro de Investigación y de Estudios Avanzados (CINVESTAV- IPN).

(Mexico.)

September 1971 - August 1973:

CONACyT Scholarship. Instituto Politécnico Nacional.

(Mexico.)

September 1974:

Ph.D. in Physics Candidate. University of California (Santa Barbara.) (UCSB)

July 1981:

Ph.D. in Physics. UCSB

September 1973 - August 1976:

CONACyT Scholarship. UCSB

September 1979 - December 1979:

DUPONT Scholarship. UCSB

December 1991:

Diploma in Mathematics Education. Sección de Matemática Educativa del Departamento de Matemáticas. CINVESTAV-IPN.

(Mexico.)

July 2006:

Alternative Certification for Type 09 teaching credential (Physics endorsement) in the state of Illinois, Benedictine University, Lisle, Illinois.

October 2006:

State of Illinois Certificate Number 2242368 for Initial Secondary Teaching grades 6 to 12. Certificate Endorsements: Physical Science, Middle School and Science-Physics, Senior High School.

Professional qualifications:

March 1970 - February 1971:

Laboratory assistant. Plasma Physics Laboratory.

Comisión Nacional de Energía Nuclear.

(Mexico.)

September 1971 - January 1972:

Assistant Professor. Physical Electronics. ESIME-IPN

(Mexico.)

September 1972 - August 1973:

Teaching Assistant. Physics Department. CINVESTAV-IPN.

(Mexico.)

September 1976 - August 1977:

Research Assistant. Physics Department. UCSB.

September 1977 - March 1979:

Teaching Assistant. Physics Department. UCSB.

February 1980 - August 1981:

Assistant Professor. Benemérita Universidad Autónoma de Puebla (BUAP). Facultad de Ciencias Físico Matemáticas (FCFM).

(Mexico).

September 1981 - August 1998 :

Professor. BUAP-FCFM.

August 1998 - January 1999 :

Free Agent Translator.

January 1999 - December 2001.

Software Engineer. Lucent Technologies. Naperville, Illinois.

December 2001 - January 2004:

Free agent translation, Science and Spanish Tutoring, part-time Mathematics Instructor Elgin Community College.

January 2004 - current

Chief Scientist at Lynk Labs Inc. Elgin, Illinois.

August 2005 - June 2006:

Science Teacher, Glenbard East High School, Lombard, Illinois.
 August 2006 – August 2007:
 Bilingual Mathematics Teacher, East Aurora High School, Aurora, Illinois.
 June - August 2007:
 Mathematics Instructor, Waubensee Community College, Aurora, Illinois
 February 2008 - January 2012:
 Mathematics Education Professor, Universidad Autónoma de
 Guerrero, México
 January 2012 - Present
 Develop Moodle platform for online education.
 August 10 2012 - Present
 Adjunct Astronomy Instructor, Waubensee Community College,
 Plano, Aurora, and Sugar Grove Illinois
 July 2, 2013 - February 13, 2014
 Software Tester at Chicago Mercantile Exchange.
 February 14, 2014 - Present
 Develop Pen-Tablet based, art and programming project.

Research visits:

August 1982 - August 1983:
 Postdoctoral visit. Applied Mathematics Department.
 Massachusetts Institute of Technology. (MIT)
 July 1984 - September 1984:
 Summer visit. Applied Mathematics Department. MIT.
 March 1986 - March 1987:
 Sabbatical visit. Departamento de Física. CINVESTAV- IPN.
 February 1988 - March 1988:
 Research visit. Physics Department. UCSB.
 September 1994 - August 1995:
 Sabbatical visit. Physics Department. Fermi National Accelerator Laboratory
 (Fermilab). Batavia, Illinois.

Publications:

1. Third Eikonal in Quantum Electrodynamics. (University Microfilm International. Ann Arbor, Michigan, August 1981.)
2. Chaos and loss of predictability in the periodically kicked linear oscillator. Revista Mexicana de Física Vol. 35 No. 2 (1989) 222.
 With Germán Luna.
3. Symmetries of the quasicrystal mapping. [Physics Letters A Vol. 135 No. 3 \(1989\) 190.](#)
 With Eduardo Piña.
4. Studies with a Water Cherenkov Detector for the Pierre Auger Observatory.
 F. Alcaraz, E. Cantoral, A. Fernández, M. Medina, C. Pacheco, R. López,
 L. Nellen, J. C. D'Olivo, M. Rubio, S. Román, H. Salazar, J. Valdés, M. Vargas, L.
 Villaseñor, and A. Zepeda. Rev. Mex. Fis. Vol. 44, (1998) 479-483;
 GAP 97 050.(82 K)
5. Proposal for the Optical System of the Fluorescence Detectors of the Auger Project.
 A. Cordero, J. Castro, J. Cuautle, A. Fernández, E. Cantoral, H. Salazar, and J.
 Valdés.

GAP 97 045.(55K)

Proceedings of the XXV International Cosmic Ray Conference, Durban, South Africa.(1997).

6. The Mexican Participation at the Pierre Auger Observatory: Recent results

S. Román, F. Alcaraz, E. Cantoral, J. Castro, A. Cordero, A. Fernández, R. López, C. Pacheco, M. Rubin, H. Salazar, J. Valdés, M. Vargas, L. Villaseñor and A. Zepeda.

Instrumentation in Elementary Particle Physics, The VII ICFA School. Ed. G. Herrera Corral and M. Sosa Aquino. AIP Conference Proceedings 422. AIP (1998), pp.399-406. (87 K)

7. Use of decay electrons from stopping muons as a tool for calibration of Cherenkov tanks of the Pierre Auger Project

L.Villaseñor, F. Alcaraz, E. Cantoral, A. Cordero, M. Malfan, A. Fernández, R. López, M. Medina, C. Pacheco, S. Román, H. Salazar, M. Vargas, J. Valdés-Galicia and A. Zepeda.

Proceedings of the XXV International Cosmic Ray Conference, Durban, South Africa.

Eds. M. S. Potgieter, B. C. Raubenheimer and D. J. Van der Walt, (1997), pp. 197-200.

8. Proposal for the Optical System of the Fluorescence Detectors of the Auger Project

A. Cordero, E. Cantoral, J. Castro, A. Fernández and R. Pastrana.

GAP 96 039. (155 K)

Note:

All the Auger Project Documents can be obtained also from:

<http://www.fis.cinvestav.mx/auger/papers.html>

Patents:

6,192,412 Computer file transmission system and method. US Patent & Trademark Office. Cantoral et al. (February 20, 2001).

<http://www.google.com/patents/US6192412>

US 8742630 B2

One wire self referencing circuits for providing power and data (June 3, 2014)

James N. Andersen, Eduardo Cantoral, Michael Miskin

<http://www.google.com/patents/US8742630>

Advisor for the following Bachelor of Sciences Theses:

Arturo Fernández Téllez. Colisión elástica de partículas escalares. BUAP 1986. SNI III since September 6, 2013

Rodolfo Palomino Merino. La ecuación de Dirac-Pauli. BUAP 1988. SNI I

Benito Flores Desirena. El oscilador armónico supersimétrico. BUAP 1989.

Eleazar Cuautle. El oscilador armónico de Caratheodory. BUAP 1995. SNI II

Advisor for the Master of Sciences Thesis:

Eleazar Cuautle. Estudio del Decaimiento de $\Lambda_{b,c}$. BUAP 1996. SNI II

Teaching experience:

Over 50 undergraduate and graduate physics courses taught. One year teaching three physics classes at Glenbard East High School. One year teaching five mathematics classes at East Aurora High School. Over 10 undergraduate and graduate Mathematics Education courses at University of Guerrero at Chilpancingo. Classes in Heuristics, Economic Analysis, Communication Skills, and Technical English for non Native Speakers., During the International Year of Astronomy (2009), I taught an Astronomy class for non-scientists, together with Professor Jorge González Mendieta. For this class I used the textbook, [The Cosmos](#), by Alexei V. Filippenko and Jay M. Pasachoff. During a few weeks stay in the US, I taught a class online at the University of Guerrero, Mexico, with Professors Jorge González Mendieta, and Edgar Altamirano Carmona. Developed tools with Moodle for online education. Working on a proposal for Online Education. Working on a tutoring program based on [Edx](#).

Teaching Philosophy

The student should be attentive, therefore the instructor has to grab their attention.

Administrative experience:

Head of the High Energy Physics Group at BUAP-FCFM.

This required the financial administration of three research grants.

Member of the Evaluation Committee of BUAP. This committee decided the Faculty promotions at the University of Puebla.

Academic Dean at FCFM-BUAP. 1989-1992. This required the academic administration of 3000 students at FCFM-BUAP.

Member of the Governing Council of FCFM-BUAP. 1992- 1994. I was the representative of the Graduate School Faculty to the FCFM-BUAP Governing Council.

Member of the Organizing Committee. The 9th Lucent Technologies Software Symposium, April 11-14, 2000.

Experience with Teachers Training Program:

I have been involved with the establishment and continuation of a Teachers Training Program at FCFM-BUAP. This required the organization of several courses for High School physics and mathematics teachers. In these courses I have advocated the use of computers to teach physics and mathematics.

Experience with Experimental Physics Program:

I have started an Experimental High Energy Physics Program to extend the Theoretical High Energy Physics Program already present at the time. The Puebla Group participates in experiment E791 at Fermilab. As part of that Program there is a collaboration in the Auger Cosmic Ray Observatory to study the highest energy cosmic rays known to date.

Computer use experience:

Computing languages: Fortran, Pascal, C, C++, Java, Basic, and Python.

Computing script languages: JavaScript, Perl, Python and ksh .

Computing markup languages: HTML .

Computing protocols: TCP/IP, and CGI .

Operating systems: Linux (Red Hat, SuSE, Caldera, TurboLinux, Ubuntu), Unix (Solaris, Irix),

MS Vista, Mac OS X and VMS for Vax systems.

Computing work: Scientific programming. Teaching of Mathematica, Derive and other general purpose mathematical software useful for science and engineering. Use of WebAssign at Glenbard East High School for online homework. Use of the communication software pine and the mail utilities available on the Unix and Vax platforms where I have worked. Word processors and electronic spread sheets, like those of Microsoft, Adobe and Borland including TeX. Computer utilities like PCTools. Moodle for online education. Took a class of Object Oriented Programming at Lucent Technologies. At CME used Linux in Red Hat servers hosting the Match Engine, Falcon. Experience with Google docs.

Platforms:

Workstations SUN, VAX, and Silicon Graphics

Mobile Galaxy S III

iPhone SE

PC: IBM-PC x86, and Apple PowerPC G5. HP Mini. Dell Laptop. NUC Intel.

Spoken Languages:

English and Spanish.

Translation work:

Translated from English to Spanish technical documents and video discs for Physics Education.

Other relevant information:

I have given over forty lectures and presentations on scientific meetings and for general audiences. I have been on a radio program discussing scientific issues of general interest. I have written two articles for newspapers in Puebla concerning science. I have been on the evaluating committee of close to forty bachelor, master of sciences and doctorate theses. I initiated the electronic version of the "La Jornada de Oriente" newspaper in Puebla, Mexico. Volunteer at People Educating People program at College of DuPage (CoD) at Glen Ellyn, Illinois. I help with mathematics tutoring for the General Education Development (GED) program in Spanish at CoD. As part of the International Year of Astronomy in Guerrero, I built a small Newtonian telescope with the help of UNAM, and UAP. Taught a Simulation Class using SimPy, a simulation package written in Python. Developed an Online Platform for Algebra class using Moodle. Took a class of Graph Theory with the book Graphs, Surfaces and Homology, by Peter Giblin. Study Random matrices. President at the Ph.D Thesis defense of Andrei Jesús Martínez Mendoza, at the Physics Institute "Luis Rivera Terrazas" in Puebla, Mexico. Participated in Free Software activities at Chilpancingo, Guerrero. Recently gave an online conference on the experience at Lucent and CME Group, for the Open Source community in that part of Mexico, FiDiSoHL 2016, FiDiSo 2017. Acapulco Newspaper science articles. Talk on Open Source blockchain.

Coached high school students for the Science Olympiad in Mexico and the US.

Invited Alexei V. Filippenko for the celebration of the International Year of Astronomy (IYA) to Acapulco, Chilpancingo, and Mexico City in 2009. As part of the activities for the IYA I setup a webpage: <http://yoalcicitaltin.blogspot.com/> This page is used for the Introduction to Astronomy Course at Waubensee Community College, Plano IL, I taught during the Fall Semester of 2012

Collaborated with professor Hung Cheng in his research on Quantum Field Theory at the Massachusetts Institute of Technology. Professor Cheng has taught the Applied Mathematics course for several years now, for which he wrote a textbook. This book can be used for an undergraduate, or graduate class of Mathematical Methods of Physics.

Software Engineering Experience at Lucent:

Studied the foundations of Robust Process Automation (RPA). This is a method to automate software processes. When the process is well understood one can write a software system that mimics a human operator. The system is robust because it has built in a set of reliability strategies. It is an operating system for controlling process in space and time. Managed several software construction tasks like the production of tapes and CD ROMs for Lucent products. Maintained several Web pages. Was involved in audio capabilities for Webpages with text to speech software. Presented the results of the RPA team in six Industry Symposia. I was in charge of a section in a training class for an RPA service. We studied the port of RPA to mobile devices, like PDAs from Palm.

Participated in the 9th Lucent Software Symposium at Naperville, IL - April 11-14, 2000.

MTS at Lucent

Position and function at Lucent.

Position:

Member of Technical Staff (MTS), Software Engineer.

Function:

Member of the Software Administration Department, under John Dalby. We managed the software process for the 5ESS Information Engine. There were over half a million lines of code to connect callers through the circuit switch technology. Each time a person call, the switch found a route of fixed points making a circuit, which was allocated for the call. On one side was the initiator, and at the other the recipient. When the call ended, the circuit was destroyed. The 5ESS was a digital switch working under the Unix operating system.

More specifically, I was a member of the Robust Process Automation (RPA) team under Joseph Lennert. Mr. Lennert invented a way to automate software processes. Carefully observe how the task is performed by a human, then write a program in Unix shell, [Korn](#)

[shell](#), with enough, robust strategies, to maintain high reliability. With a virtual machine strategy write a platform running on top of the Unix operating system used on the work stations, where the administration was actually realized. This work led to a patent, in which I am a participant.

To support the work of the team, I taught several tutorials for Lucent employees to use RPA software. I was given some modules of the software to code in Korn Shell. I participated in the organization of symposia with guests from inside and outside the company, like [David Korn](#), and [Eric S. Raymond](#). I maintained a website with [Apache](#), for the deployment and use of RPA software, I produced tapes to make hard copies as well.

I was asked to review different Search Engines and advise Lucent on possible products.

Software Tester Experience at CME Group

Given the increasing use of financial data, I had tested software to increase the volume of transactions at an electronic exchange. Bigger and better investment instruments are needed for Big Data applications. Tested new functionality for clients. Made the first 40 leg User Defined Spread for Futures. One can buy energy contracts for 5, 10, and 15 years with these software instruments. For instance the Mexican government successfully put in the market contracts like these, after changing Article 27 of the Constitution, which regulates the use of oil, natural gas, and other fossil fuels, previously owned by the Government's company: PEMEX. Given the maturity of futures contracts, the software tools I was testing did not allow a certain type of strategy on leap years. This could be corrected, but my contract expired, and I did not fix it. CME restructured its IT department.

Functions and responsibilities at CME.

Software tester.

[Agile software development](#) process.

Agile software development is a group of [software development methods](#) based on [iterative and incremental development](#), where requirements and solutions evolve through collaboration between self-organizing, [cross-functional teams](#). It promotes adaptive planning, evolutionary development and delivery, a [time-boxed](#) iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen tight iterations throughout the development cycle.

We had meetings weekly with workers outside our team. Inside the team, we had daily meetings, lasting half an hour to an hour. Business liaisons, coders, and testers discussed the necessary changes. Each of us reported work done, to be done and blockers. In particular I was involved in the following for [GLOBEX](#):

For the Options Acceleration Project:

1. For the [KC HRW Wheat Options](#) we developed a software for outside market hours

trading.

2. For the Energy sector we developed [Option Calendar Spreads](#)

For the Futures User Defined Spreads (UDS) Project:

1. For the Energy sector we developed software for up to forty contracts in a single UDS, allowing five, ten, and fifteen year future contracts.
2. We developed software capable of reporting transactions down to nanoseconds.
3. With a new FIX format [Simple Binary Encoding](#) we ported functionality from the Trade Engine (Falcon) to processors outside it. [Open Source code was used.](#)

Looking for a job in Applied Science and Data Mining.

An Information Engine, gets Information, and produces Information. E791 was an experiment at Fermilab; 20,000 magnetic digital tapes were produced. With an Information Engine, charm quark states properties were obtained, with supercomputer made of PCs connected with TCP/IP. 5ESS is a telephone digital switch built and operated by Lucent Technologies, based on the UNIX operating system. Millions of conversations are supported by the system. Falcon is a UNIX based digital exchange for the Chicago Mercantile Exchange (CME). Using the same PC cluster supercomputer architecture as the E791 Information Engine, millions of financial transactions are supported.

Using the concept of Information Engine (IE) one can analyze several current problems, to name a few we have Climate Change, Disease Control, and Investment.

Resource allocations are crucial to address pressing problems. How much for Climate Change, and Disease Control say? These are only two examples of pressing issues faced by people, businesses, and nations. Science provides tools to go through these possible bottlenecks of development.

[Hands: TTP](#)

An IE is constructed, for the Tablet & Pen Project (TPP).

The idea is from *Motion to Notion*. Using [Embodied Cognition](#) of Maturana, and Varela, one can decode, how the brain learns through the hand motions of the child, to build notion connections in the nervous system.

First people move their hands to write letters, and then use those brain connections to compose algorithms, and computer programs.

Professor Cantoral is developing a method to coordinate eyes and brains to use electronic writing tablets.

References:

Robert L. Sugar
Physics Department
University of California
Santa Barbara, CA 93106-9530
Telephone: (805) 893-3469
Fax: (805) 893-2902
E-Mail: sugar@physics.ucsb.edu

Michael A. Rumore
Consultant at Private Firm
E-Mail: mike.a.rumore@gmail.com
Telephone: (630) 452-8634

Cris A. Fugate
Alion Science and Technology
Lead Programmer Analyst
E-Mail: crisafugate@aol.com

Arturo Fernández Téllez.
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Facultad de Ciencias Físico Matemáticas
Universidad Autónoma de Puebla
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México
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Science Department Chair
Glenbard East High School
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AT&T
Senior Product Marketing Manager
International Transport Services
One AT&T Way
BedminsBedminster, NJ 07921
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The University of Texas Pan-American
1201 W. University Dr.
Edinburg, TX 78539
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Arnulfo Zepeda
Professor of Physics
CINVESTAV, IPN
Mexico City, Mexico
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Humberto Salazar Ibargüen
Professor of Physics
Facultad de Ciencias Físico Matemáticas
Universidad Autónoma de Puebla
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México
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QA Analyst at CME Group
555 W. Washington Blvd.
Chicago IL, 60661
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Tom Carter
Professor Physics CoD
425 Fawell Blvd
Glen Ellyn IL, 60137
E-Mail: cartert@cod.edu