



CURRICULUM VITAE

Charles H. Brenner, Ph.D.

consulting in forensic mathematics

6801 THORNHILL DRIVE

OAKLAND, CALIFORNIA 94611-1336

(510) 339-1911 FAX (510) 339-1181

E-MAIL: chb@dna-view.com

WEB: www.dna-view.com

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Consulting in Forensic Mathematics —
Mathematics, statistics, population genetics
Computer software for DNA identification
Court testimony, reports, and consultation
Research, academic publication, teaching

PROFESSIONAL BACKGROUND

Visiting Scholar June 1998-present, Department of Public Health, University of California, Berkeley

Scientific advisory committee memberships

Scientific **Steering committee for the ICMP** advising on Bosnian war identifications

KADAP (Kinship and Data Analysis Panel) – scientific advisors to the New York Office of the Chief Medical Examiner for the World Trade Center identifications. Also consultant directly to the OCME

HVDIEG (Hurricane Victim DNA Identification Expert Group) – similar panel assisting Katrina ID's.

ISFG (International Society of Forensic Genetics) DNA Mixture Interpretation Group – committee to make recommendations for DNA mixture interpretation

ISFG Paternity Testing Commission – committee to make recommendations for paternity testing laboratories

Alliance of Forensic Scientists for Human Rights Investigations (AFSHRI) – assisting ProBúsqueda project to reunite adoptees “disappeared” from their biological families during the civil war

Consultant 1977-present

in software, mathematics, statistics, and population genetics. About 95% is related to DNA identity.

Mass fatality/identification projects – policy & casework consultation, providing & enhancing software (DNA·VIEW) for World Trade Center (**Sep 2001- Aug 2005**); Thailand tsunami (**early 2005**); Katrina identifications (**Dec 2005, ongoing**); Probusqueda El Salvador orphan/adoptees (**2004, ongoing; pro bono**); Japanese WWII pilots in Siberia (**spring 2004**); Kuwaiti prisoners in Iraq (**2003**); Bosnian war victims (ICMP. **2002, ongoing**); SwissAir 101 crash (Halifax, **fall 1998**), AA 587 crash (Queens, **November 2001**).

A large share of my consulting work consists of on-going relationships with fifty or more paternity and forensic DNA testing laboratories worldwide – traditionally paternity and crime, lately largely disaster victim identification. Most of these labs use DNA·VIEW and/or PATER — software packages that I have written for DNA identification analysis. The relationship includes support for the software, statistical and population genetic consulting, and occasional visits and lectures under the rubric of continuing education.

The laboratories include Office of the New York Medical Examiner (**2001-present**: consulting on identification of victims in the World Trade Towers attack), the ICMP laboratory in Bosnia, and scores of other private and public criminal and paternity labs in every continent except Antarctica.

Other DNA consulting consists of testimony, reports, review and advice on particular cases — criminal, civil, and private. Current and past work includes assisting with identification, especially through kinship, of the mass identification projects listed above; several analyses of likely racial origin from DNA (Baton Rouge serial killer 2003, *pro bono*, NY East-Side rapist 1997, *pro bono*). Casework includes courtroom testimony about DNA mixtures (both prosecution and defense); testimony supporting DNA admissibility; assistance to both prosecution and defence in (different) criminal cases involving paternity; a multiple-rape defense case involving brothers; inheritance disputes wherein secondary claimants allege half-

sibship, and defense of a negligence claim involving *in vitro* fertilization.

Complicated kinship (i.e. inheritance, related rapists, disaster identification), racial identification, and mixed-stain analysis are areas where I have particular interest and authority, having published several papers and developed specialized software to deal with problems in these areas.

The other 5% is pure mathematics — probability computation and computer simulations for a company that insures sweepstakes, sporting propositions, lotteries, and the like.

Academic Visitor May-December 1999, Department of Genetics, Leicester University, England

Collaboration as mathematician/statistician/computer modeler with geneticists researching the nature of mutations in the laboratory of Prof. Sir Alec Jeffreys (inventor of DNA fingerprinting)

Visiting Lecturer 1985, 1986. UCLA, Department of Mathematics.

Systems Analyst/Applications Consultant 1974-1977. Scientific Time Sharing Corporation. Design and implementation of computer language software and of customer applications

Bridge Player 1968-1973 London

Eked out living at bridge clubs while studying violin. Tournament record includes: Crockford's cup (English team championship), winner 1969; Gold Cup (British team championship) 3/4 place 1972; Eastborne Two Stars (British pairs championship) 3rd place, 1971; Grand National Teams (one of 4 American team championship events) 3/4 place 1975; Blue Ribbon Pairs (premiere American pairs event) 10th place, 1976; North American Swiss Teams 9th place, 1997; Multiple regional and sectional wins; Life Master since age 20.

IBM Research Staff 1967-68, T.J. Watson Research Center, Yorktown Heights, NY. APL development

Scientific, business, systems, and mathematical programming from 1960

EDUCATION

B.S., mathematics, Stanford University, 1967. Putnam Competition honorable mention (twice). (The Putnam is a national mathematics competition sponsored by the Harvard mathematics department, attempted by a few thousand students from colleges around the country. Honorable mention means placing 11-25.)

Ph.D., pure mathematics UCLA, 1984. My thesis, "Asymptotic analogues of the Rodgers-Ramanujan identities," is related to the partition (meaning the number ways a pile of n pebbles can be separated into several piles) identities of the early 20th century mathematician Ramanujan, and combines aspects of analytic number theory, algebraic number theory, and combinatorics.

PROFESSIONAL SOCIETIES AND ASSOCIATIONS

American Academy of Forensic Sciences, fellow

International Society of Forensic Genetics

Alliance of Forensic Scientists for Human Rights Investigations

SELECTED PUBLICATIONS

———— DNA ANALYSIS ————

- [1] KIJONG KIM, CHARLES H BRENNER, VICTOR H MAIR, KWANG-HO LEE, JAE-HYUN KIM, EREGZEN GELEGDORJ, NATSAG BATBOLD, YI-CHUNG SONG, HYEUNG-WON YUN, EUN-JEONG CHANG, KEUN-CHEOL KIM, AE-JA PARK, DONG-SUB SOHN, INJA LIM, DAE-JIN KIM, YOON-HEE CHUNG, SUNG-SU KIM, WON-BOK LEE, KYUNG-YONG KIM (2009 *in press*) A Western Eurasian male is found in 2000-year-old Elite Xiongnu Cemetery in Northeast Mongolia, *American Journal of Physical Anthropology*
- [2] BRENNER CH (2009 *in press*) Fundamental problem of forensic mathematics – the evidential value of a rare haplotype, *Forensic Science International: Genetics*
- [3] BRENNER CH (2008 *letter*) Counterexample to a conjecture of Krawczak, *Forensic Science International: Genetics*, **2** p75
- [4] GJERTSON DJ, BRENNER CH, *et al* (2007) ISFG: Recommendations on Biostatistics in Paternity Testing, *Forensic Science International: Genetics* **1 (3)**: 223-231

- [5] BRENNER CH (2006 July15) *Forensic Genetics: Mathematics* in Cooper DN (ed.) Encyclopedia of Life Sciences, John Wiley & Sons, Ltd: Chichester.
<http://www.mrw.interscience.wiley.com/emrw/047001590X/els/article/a0005451/current/pdf>
- [6] GILL P, BRENNER CH, BUCKLETON JS, ET AL. (2006 July13) DNA commission of the International Society of Forensic Genetics: Recommendations on the interpretation of mixtures, *For Sci International* **160 (2-3)**: 90-101
- [7] BIEBER F, BRENNER CH, LAZER D (2006 June2) Finding Criminals Through DNA of Their Relatives, *Science* **312(5778)**: 1315-1316
- [8] BRENNER CH (2006) Some mathematical problems in the DNA identification of victims in the 2004 tsunami and similar mass fatalities, *For Sci International* **157**: 172-180
- [9] BIESEKER LG ET AL (2005 Nov18) DNA Identifications After the 9/11 Trade Center Attack, *Science* **310**: 1122-1123
- [10] BRENNER CH, INMAN K (2004) Commentary on: Thompson WC, Taroni F, Aitken CGG, How the Probability of a False Positive Affects the Value of DNA Evidence, *J For Sci* Jan 2004
- [11] BRENNER CH (2004) Multiple mutations, covert mutations and false exclusions in paternity casework, *Progress in Forensic Genetics* **10**, Eds. Doutremépuich, Morling, Elsevier Science B.V., 112-114
- [12] BRENNER CH, WEIR BS (2003) Issues and strategies in the identification of World Trade Center victims, *Theor Pop Bio* **63**: 173-178
- [13] BUARD J, BRENNER C, JEFFREYS AJ (2002) Evolutionary fate of an unstable human minisatellite deduced from sperm mutation spectra of individual alleles, *Am J Hum Genet* **70**:1038-1043
- [14] BRENNER CH (2001) Family Secrets Revealed, *Progress in Forensic Genetics* **9**, Ed. B Brinkmann, Elsevier Science B.V., 633-635
- [15] GILL P, BRENNER C, BRINKMANN B, BUDOWLE B, CARRACEDO A, JOBLING MA, DE KNIJFF P, KAYSER M, KRAWCZAK M, MAYR WR, MORLING N, OLAISEN B, PASCALI V, PRINZ M, ROEWER L, SCHNEIDER PM, SAJANTILA A, TYLER-SMITH C (2001) technical note: DNA Commission of the International Society of Forensic Genetics: recommendations on forensic analysis using Y-chromosome STRs, *Int J Leg Med* **114(6)**:305-309
- [16] BRENNER CH (1999) Kinship Analysis by DNA When There Are Many Possibilities, *Progress in Forensic Genetics* **8**, Eds G Sensabaugh et al., 94-96
- [19] BRENNER CH (1998) Difficulties in estimating ethnic affiliation (letter) *Am J Hum Genet* **62**:1558-1560
- [20] BRENNER CH (1997) Probable Race of a Stain Donor, *Proceedings from the Seventh Human Identification Symposium 1996*, Promega Corporation 48-52
- [22] BRENNER CH, FIMMERS R, BAUR MP (1996) Likelihood Ratios for Mixed Stains When the Number of Donors Cannot be Agreed, *Int J Legal Med* **109(4)**:218-219
- [25] BRENNER CH (1994) Clouding the Simpson DNA Issue, (Op-Ed) *Los Angeles Times*, September 4
- [32] BRENNER CH, MORRIS JW (1990) Paternity Index Calculations in Single Locus Hypervariable DNA Probes: Validation and Other Studies *Proceedings for The International Symposium on Human Identification 1989*, Promega Corporation 21-53

———— PATERNITY ATTRIBUTION ————

- [34] TAMAKI K, BRENNER CH, JEFFREYS AJ (2000) Distinguishing minisatellite mutation from non-paternity by MVR-PCR, *Forensic Science International* **113**: 55-62
- [35] SAWAGUCHI T, BRENNER CH, SAWAGUCHI A (1998) Application of DNA-VIEW & PATER to a kinship paternity case, *Rom J Leg Med* **6(1)**:66-70
- [36] BRENNER CH (1997) Symbolic Kinship Program, *Genetics* **145**:535-542
- [37] BRENNER CH (1993) A Note on Motherless Paternity Case Computation, *Transfusion* **33**:51-54
- [40] BRENNER CH (1985) Evidence, Probability, and Paternity, (letter) *Am J Hum Genet* **82**:6-827
- [41] BRENNER CH (1983) Calculation of paternity index, in *Inclusion Probabilities in Paternity Testing* 632-638, Amer. Assoc. of Blood Banks, Arlington

———— PURE MATHEMATICS ————

- [42] BRENNER CH (1986) Asymptotic analogues of the Rogers-Ramanujan identities, *J. of Combinatorial Theory, Ser. A*,

[43] BRENNER CH & JL (1962) The popularity of small integers as primitive roots, *Numer. Math.* 4:336-342

———— COMPUTATION ————

[44] BERNECKY R, BRENNER CH, JAFFE SB, MOECKEL GP (1990) ACORN: APL to C on Real Numbers, *Proceedings of the International Conference on APL*, 1990

SELECTED PRESENTATIONS

- [1] “Adventures in kinship” workshop lecture at Forensica2010, Czech Republic, May
- [2] “Y haplotype evolution and forensic implications” – general talk at Forensica2010, Czech Republic, May 2010
- [3] “Y-haplotype matching probability – Evolution and forensic implications” workshop presentation at AAFS, Seattle, February 2010
- [4] “Bayes Theorem even simpler” – poster at ISFG, Buenos Aires, September 2009
- [5] “Dropout for dummies – modular methods for dropout analysis” talk at ISFG, September 2009
- [6] “Logic and mathematics of MVI” at MVI workshop, ISFG, September 2009
- [7] “APL, DNA, and Sex (parts I & II)”, presentation to computer language conference, Elsinore, October 2008
- [8] “The Forensic Evidence Value of a Y-Haplotype”, Deutschen Gesellschaft für Abstammungsbegutachtung, Cologne, June 2008
- [9] Haplotype workshop – ½ day presentation at ISFG English Speaking Working Group, Sinaia Romania, June 2008
- [10] “Finding Criminals Through DNA of Their Relatives” (talk) AAFS meeting, San Antonio, February 24, 2007
- [11] DNA Kinship Class for Physicians for Human Rights’ International Forensic Program, Fort Worth, February 13, 2007
- [12] “Identification Problems when there are Related Victims,” October 21, 2006 invited lecture at AABB workshop, Miami
- [13] “Evidential Strength of a Rare Haplotype,” talk September 30, 2006 at DNA in Forensics meeting, Innsbruck, Austria
- [14] “Using the DNA·VIEW Kinship program with X-linked markers,” talk September 28, 2006 at DNA in Forensics meeting, Innsbruck, Austria
- [15] “Finding relatives in haystacks” (invited) lecture at 2006 Seattle Showcase Symposium in Statistical Genetics at the University of Washington, June 24 2006
- [16] “Identifying Related Victims in a Mass Fatality,” talk at ISFG English Speaking Working Group, June 9, 2006
- [17] “Simultaneous versus serial DNA identification of related tsunami victims” poster at ISFG English Speaking Working Group, June 8, 2006
- [18] “Kinship analysis in mass disaster identification,” “Mutations in paternity,” “GEP paper challenge,” May 31, 2006 invited presentations to the Spanish/Portuguese section meeting of the ISFG, Madrid
- [19] DNA mixture class to the Baton Rouge Crime Lab, May 8, 2006
- [20] “DNA identification and APL,” plenary lecture at Naples, Fla. APL (computer) conference, November 8, 2005
- [21] “Relationship calculations in unusual cases,” HITA workshop September 30, 2005
- [22] “Racial determination with forensic STR markers” poster September 28, 2005 Promega meeting Dallas
- [23] “Stories from Forensic Mathematics,” September 22, 2005 invited public lecture at U. of Conn
- [24] Panelist presenting and discussing ISFG’s DNA mixture recommendations, ISFG meeting September 16, 2005 in Azores
- [25] “Represented by proxy” (talk) 6th Forensic Statistics meeting, Phoenix, AZ, March 18, 2005
- [26] “Pitfalls in mixture evaluation”, (invited talk), California Association of Criminalists Seminar, October 26, 2004
- [27] 11th Annual DNA·VIEW Workshop, (organized, sponsored and presented) September 25, 2004, Göttingen, Germany
- [28] “Perspectives on the Variety of Mass Identification Projects” (talk) AAFS meeting, February 20, 2004
- [29] “Guessing the Race of a Stain Donor (poster) AAFS meeting, February 18, 2004
- [30] DNA Forensic Calculations (2 day class) New York State Police, Albany, November 20-21, 2003
- [31] “Mutations, covert mutations, and multiple mutations in paternity casework,” Promega Paternity Minisymposium, Phoenix, September 29, 2003
- [32] “Can DNA Solve This?,” (poster, C Brenner, R Staub), Promega 14th International Symposium on Human Identifica-

tion, October 2003

- [33] 10th Annual DNA·VIEW Workshop, (organized, sponsored and presented) September 18, 2003, Münster, Germany
- [34] "Approaching and avoiding DNA mixtures," September 2003 invited lecture at the International Symposium on Forensic DNA Technologies, September 19, 2003, Münster, Germany
- [35] "Mutations and multiple mutations in paternity casework," September 13, 2003 invited lecture to the 19th Congress of the International Society of Forensic Genetics in Arcachon, France
- [36] "Searching DNA profiles to identify victims in a mass disaster," September 11, 2003 lecture to the 19th Congress of the International Society of Forensic Genetics in Arcachon, France
- [38] "Kinship prediction and analysis," Promega Paternity Minisymposium, Phoenix, September 2002
- [39] DNA Mixture Analysis and Calculations (2 day class) to NY criminalists at Westchester NY, April 2002
- [42] "Iterative Cherry Picking WTC Victim Identifications," National Institute of Justice WTC Kinship and Data Analysis Panel, Albany, NY, November 2001
- [43] "Family Secrets Revealed, August 2001, lecture to the 18th Congress of the International Society of Forensic Genetics, in Muenster, Germany
- [44] "Matching odds with no database, and other SNP tales" August 2001, lecture to 18th Congress of the International Society of Forensic Haemogenetics, in Muenster, Germany
- [45] Discussions in Statistical Genetics for Forensic Scientists (4 day lecture series) Univ of Rome at Tor Vergata & Istuto Mendel, April 2001
- [46] Moderate panel discussion "DNA & the law" August 1999, ISALM 4th International Symposium
- [47] "DNA Identification When There Are Many Possibilities" August 1999, lecture to the 17th Congress of the International Society of Forensic Haemogenetics, in San Francisco
- [49] "The Power of SNP's — Even Without Population Data" September 1999, poster at the Tenth Promega International Symposium on Human Identification
- [50] "Strategies and calculations in DNA kinship cases" June 1999, invited lecture to the Spanish/Portuguese section meeting of the Internation Society of Forensic Haemogenetics, La Gomera, Canary Islands, Spain
- [52] "Considerations of Number, Race, and Accuracy" July 1998, invited lecture at the Conference on DNA Forensic Analysis in Annapolis, Md
- [54] "Application of DNA·VIEW to a Paternity Case" December 1997. Poster talk at the meeting of the Japanese Society of DNA Polymorphisms at Nagasaki, Japan
- [58] "A Symbolic Kinship Program: solving difficult identification problems with genetic typing" May 1997, invited lecture to the Korean Society for Legal Medicine in Kyung-ju, Korea
- [60] "Probable Race of a Stain Donor" September 1996, lecture at the Seventh Promega Human Identification Symposium, Scottsdale, Arizona
- [62] "Symbolic Kinship Program" September 1995, poster at the Sixth Promega Human Identification Symposium, Scottsdale, Arizona
- [69] "Comments and observations" (on paternity computation) 1982 select conference on Inclusion Probabilities in Parentage Testing, in Airlie, Virginia

