

Milo Schield,
Statistical Literacy Achievements thru 2025

Schild has taught introductory statistics every year for over 40 years, written a very different textbook, and created an associated course which has been adopted by a college and a university.

His goal is to help students evaluate the strengths and weaknesses of statistics as evidence in arguments, and to appreciate the value of studying statistics as a key part of the philosophy of science. Schild's focus is on observational causation (critical thinking about everyday statistics as evidence) and on how statistics can be influenced by confounding and assembly.

1) *Schild unique vision for statistical literacy as part of the future of statistical education was recognized by a major grant.* In 2001, Schild was the Principal Investigator on a successful \$500,000 grant from the W. M. Keck Foundation: "To develop statistical literacy as an interdisciplinary curriculum in the liberal arts." Dr. Donald Rubin (Harvard) and Dr. Judea Pearl (UCLA) were his colleagues in this grant to advance the teaching of observational causation at the undergraduate level. (Schild, 2001).

2) *Schild has been recognized by his peers.* In 2016, he was selected as an elected member of the International Statistical Institute. In 2018, he was selected as a Fellow by the American Statistical Association. [www.StatLit.org/pdf/2018-Schild-ASA-Fellow.pdf] In 2019, he was elected President of the National Numeracy Network. He is the US Representative of the International Statistical Literacy Project. His paper, Information Literacy, Statistical Literacy and Data Literacy, received 220 citations. His efforts at the University of New Mexico were honored with an article in the 12/2021 issue of the ISLP Newsletter: [www.StatLit.org/pdf/2021-Schild-ISLP.pdf] Milo is recognized internationally with 38 talks in 19 countries on six continents. [www.StatLit.org/pdf/Schild-Talks-International.pdf]

(3) *He has created a unique textbook.* He self-published the first 10 editions of his statistical literacy textbook: *Statistical Literacy: Seeing the Story Behind the Statistics*. Kendall Hunt published his statistical literacy textbook: *Statistical Literacy: Critical thinking about Everyday Statistics*. [<https://he.kendallhunt.com/product/statistical-literacy-2023-critical-thinking-about-everyday-statistics>] This textbook is the basis for statistical literacy courses at the University of New Mexico and at New College of Florida. This textbook is radically different: less than a 30% overlap with traditional textbooks. It introduces multivariate thinking, confounding, and 'taking into account' without using computers or algebra. It introduces the confusion of the inverse by focusing on ordinary English. His focus on the relevant details of English grammar is extremely helpful for non-native speakers. By creating a context-based statistical literacy course focused on observational causation, he is introducing a radical change in the introductory course. New topics include quasi-experiments, percentage and cases attributable, Cornfield conditions, Scanlan's paradox, and showing how controlling for a measured confounder can change statistical significance into insignificance – and vice versa.

4) *Students and faculty value Schild's Statistical Literacy course.* Over half the students agree that it should be required for all students (about 40% neutral). The UNM faculty made statistical literacy a requirement for all students majoring in statistics at the University of New Mexico. The NCF faculty made this course a requirement for all new students at New College of Florida.

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(5) *Schild has been active in statistical education.* He has delivered over 150 talks to statistical educators, and authored over 100 papers, articles and chapters. These publications have received over 1,000 citations. [www.StatLit.org/pdf/2025-Schild-Papers-Citations.pdf] According to ResearchGate, they received over 60,000 reads with most of those being from outside the US.

- Nationally, he has presented and submitted papers at 31 Joint Statistical Meeting since 1993. During those 32 years, he organized 18 topic-contributed session where he invited academics to bring outside perspectives on making statistical education might valuable.
- Internationally, he presented 38 papers in 18 countries on six continents outside the US. [www.StatLit.org/pdf/Schild-Talks-International.pdf] In 1996 he spent his sabbatical at the RSS Centre for Statistics Education then located at the University of Nottingham. He was tutored by Peter Holmes and worked with Anne Hawkins. He gave statistical talks at RSS meetings at Nottingham University, Open Hand University and the University of Edinburgh. He started developing his own approach to introductory statistics. He presented his new ideas at ICOTS-5 (1998, Singapore), the Statistical Society of Australia (1999, Brisbane), ICME-9 (2000, Tokyo), and the University of Grenada (2001, Spain). After receiving the Keck grant, Schild presented his ideas internationally at South Bank University (2001, London), ICOTS-6 (2002, Cape Town), IASSIST (2003, Ottawa).

IASE Invited Roundtable (2004, Sweden), ICME-10 (2004, Copenhagen), ISI-55 and ISI/IASE Satellite Conferences (2005, Sydney), ICOTS-7 (2006, Brazil). IASE (2007, Portugal), ICOTS-8 (2010, Slovenia), JSM (2010, Vancouver), IASE Satellite and ISI-58 (2011, Ireland), ICOTS-9 (2014, Arizona), IASE Invited Roundtable (2016, Berlin), Fields Institute (2017, Toronto), and ICOTS-10 (2018, Kyoto). His virtual talks include ISI World Statistics Congress (2021), ICOTS-11 (2022), New Directions in the Humanities (2024) and a keynote at the International Statistical Literacy Day (2025).

4) *Schild's website, www.StatLit.org, has a major impact in promoting statistical literacy by providing free access to over a thousand articles.* In 2003, Schild created this website. It is Google-ranked as #1 website dedicated to statistical literacy. Many – if not most – of those using the site have no idea that Milo owns and manages this website. With free access, it is a tremendous resource for statistics educators all over the world. Today, StatLit.org hosts over 1,600 papers, articles and slides (over 2,300 images). Almost all of these involve statistical literacy. This website is interdisciplinary: it includes links to journalism, adult literacy, quantitative literacy and numeracy. It features pages on leading authors: popular (Joel Best, Howard Wainer, Jane Miller and Uri Braun) and academic (Judea Pearl, Kaiser Fung, Jeffrey Bennett and Herbert Weisberg). Wikipedia references in website is under Statistical Literacy.

5) *Milo has brought a unique approach to statistical education.* In Milo's first paper at JSM in 1994, he said, "We must reinvent statistics." In his 1998 paper he said, the current approach "to introductory applied statistics is inadequate to provide students with ongoing statistical literacy. Emphasizing data is necessary—but not sufficient—to teach statistical literacy." "Most introductory texts and courses cover only half the topics needed for statistical literacy." "To achieve statistical literacy for all, introductory statistics must be expanded to include ... the use of statistics as evidence

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in arguments..." Since his first JSM paper in 1994, Milo has maintained an unrelenting focus on the role of statistics as evidence in arguments. He has strongly emphasized the literacy component of statistical literacy. He focused on the use of ordinary English to distinguish association from causation. He emphasized the importance of confounding long before the 2016 update to GAISE. He introduced Wainer-Lesser graphical method of standardizing: 'taking into account' the influence of confounders without using Algebra or software. He focused on how statistics are assembled: how they are defined, counted, measured, compared, modeled and presented by people who have interests and values. He has emphasized conditional probability by focusing on the use of ordinary English to describe and compare rates and percentages. In reviewing his 100+ papers, the variety of topics is impressive. Milo's papers are always assertive; he almost never revisits the same topic twice. See [www.StatLit.org/Schield-Pubs.htm]

6) Milo has created a new confounder-based statistical literacy course. In 2019, after teaching Statistical Literacy for over 20 years at Augsburg University, Milo was hired as a consultant by the Math-Stat department at the University of New Mexico (UNM). He obtained departmental approval for his statistical literacy course. He obtained university approval for this course to satisfy a math-stat requirement in the New Mexico General Education curriculum. He trained the first group of teachers and taught the first course. [www.StatLit.org/pdf/2021-Schield-ASA.pdf]

7) *Students value this Statistical Literacy course.* Students were asked to evaluate this claim: "Statistical Literacy should be required for graduation." Of the 58 at UNM in Fall 2024, 48% agreed it should be required with 31% neutral. At New College of Florida, of the 44 taking Statistical Literacy in fall 2023, spring 2024 or fall 2024, 50% agreed it should be required while 41% were neutral. When asked if the course helped their thinking, 95% agreed at New College with 5% neutral. Here is the breakout for how helpful: somewhat (16%), very (61%) and extremely (18%). These high percentages are almost unreal for a math course.

8) *Milo has been very active in supporting statistical education organizationally.* He has been a member of the ASA Section on Statistical Education since 1995. In 2011, he was elected as a member of the International Statistical Institute. [<http://isi.cbs.nl/ISImembers/isimembersS-Z.pdf>] and was elected President of the Twin Cities Chapter of the ASA. Milo has organized 17 topic-contributed sessions on statistical literacy at the ASA-JSM (a record?), one late-breaking session and a session at the ISI. He has invited over 50 speakers: outside statistics (e.g., Joel Best, Sociology; Joe Abramson, Epidemiology; and Gary Klass, Political Science), inside statistics but outside statistics education (e.g., Donald Rubin, David Cox and John Bailar) and within statistics education (e.g., Jessica Utts, Deborah Rumsey, Andrew Gelman and Robert Hayden). See [www.StatLit.org/pdf/Schield-JSM-Sessions-Statistical-Literacy.pdf]

9) *Milo has actively promoted statistics and statistical literacy outside statistics education.* His 1999 invited paper, "Statistical Literacy: Thinking Critically about Statistics" appeared in the first issue of the journal *Of Significance* published by APDU. [www.StatLit.org/pdf/1999SchieldAPDU.pdf] In 2001, Milo was the Principal Investigator on a four-year grant from the W. M. Keck Foundation along with Donald Rubin (Harvard) and Judea Pearl (UCLA). The purpose of the grant was "to develop statistical literacy as an interdisciplinary curriculum". This appears to be the first grant to

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support statistical literacy in the world. [www.StatLit.org/pdf/2001-Augsburg-Now-Keck-Grant.pdf] In 2004, his invited paper, "Statistical Literacy and Liberal Education at Augsburg College", appeared in the AAC&U's *Peer Review*. [www.StatLit.org/pdf/2004SchieldAACU.pdf] Sociologist Joel Best referred to Milo as "the [statistical literacy] movement's leader" in his book, *More Damned Lies and Statistics*. In 2004, Milo's invited paper, "Information Literacy, Statistical Literacy and Data Literacy", appeared in *Information Quarterly*. [www.StatLit.org/pdf/2004-Schield-IASSIST.pdf] (436 GS citations) In 2008, the MAA published Milo's invited paper, "Quantitative Literacy and School Mathematics", in a book titled *Calculation vs. Context*. He said that statistical literacy should be offered in place of Algebra II for college-bound students in non-quantitative majors. [www.StatLit.org/pdf/2008SchieldMAA.pdf]

In 2011, he created a new catalog course at Augsburg: "Statistical Literacy for Managers" and his invited paper, "Statistical Literacy: A New Mission for Data Producers", was published in the *Statistical Journal of the International Association of Official Statistics*: [www.StatLit.org/pdf/2011SchieldSJIAOS.pdf] In 2022, his invited paper, Statistical Literacy: Seven Simple Questions for Policymakers, was published in the *Journal of the International Association of Official Statistics*: [www.StatLit.org/pdf/2022-Schield-SJIAOS.pdf] His invited paper, Statistical Literacy: Thinking Critically about Confounding, was presented at the International Conference on Critical Thinking. [www.StatLit.org/pdf/2022-Schield-CCT.pdf] In 2024, his invited paper, Using English to help students Understand Quantitative Ideas, was published in the *Journal for the Teaching of English Grammar*. [www.StatLit.org/pdf/2024-Schield-ATEG.pdf] His invited paper, Statistical Literacy for General Education, was presented at the AAC&U meeting on General Education: www.StatLit.org/pdf/2024-Schield-AACU.pdf His invited paper, Statistical Literacy: A New Course, was the closing keynote at the International Day of Statistical Literacy: [www.StatLit.org/pdf/2024-Schield-ISLP.pdf] In 2024, he was listed in Who's Who: www.miloschield.com/

10) *Milo has been active in advancing statistics literacy within the discipline.* In 1994, he presented his first statistics paper at the ASA JSM, In 1998, Milo was a pioneer in his use of "statistical literacy": [www.StatLit.org/pdf/1998SchieldASA.pdf] His 1999 paper, "Simpson's Paradox and Cornfield's conditions", was cited as a "great paper" by Peter Westfall, a former Editor of The American Statistician. [www.StatLit. pdf/1999SchieldASA.pdf] In 2004 his invited paper, "Statistical Literacy Curriculum Design", appeared in the IASE *Curricular Development in Statistics Education*: [www.stat.auckland.ac.nz/~iase/publications/rt04/2.4_Schield.pdf] or [www.StatLit.org/pdf/2004-Schield-IASE.pdf] In 2005, Milo published the first edition of his textbook, *Statistical Literacy – seeing the story behind the statistics*, for students in non-quantitative majors. This is arguably the first introductory textbook that includes Cornfield's necessary conditions for a confounder to nullify or reverse an observed association.

11) *Milo remains active.* He is currently teaching his Statistical Literacy course in person at New College of Florida and online at the University of New Mexico (ABQ). At New College, he is the director of Techne emphasizing quantitative thinking and the philosophy of science. He will be giving an invited talk at the 2026 meeting of the AAC&U on Transforming STEM Higher Education.