SIGMOD Record

SIGMOD Record is a quarterly publication of the Special Interest Group on Management of Data (SIGMOD) of the Association for Computing Machinery (ACM). SIGMOD is dedicated to the study, development, and application of database and information technology. SIGMOD Record Web Edition is also freely available online at **https://sigmodrecord.org/**.

SIGMOD Record solicits contributions of articles, reports, and proposals for special sections. Conference announcements and calls for papers can be published if relevant to the interests of the SIGMOD community and, in most cases, are limited to one page. The SIGMOD Record editorial policy can be found online at: **https://sigmodrecord.org/sigmod-record-editorial-policy/**.

Papers should be submitted electronically in PDF format through the submission site for SIGMOD Record at **https://mc.manuscriptcentral.com/sigmodrecord/**. Detailed information for authors is available at **https://sigmodrecord.org/authors/** .

By submitting your article for distribution in this Special Interest Group publication, you hereby grant to ACM the following non-exclusive, perpetual, worldwide rights:

- to publish in print on condition of acceptance by the editor;
- to digitize and post your article in the electronic version of this publication;
- to include the article in the ACM Digital Library and in any Digital Library related services; and
- to allow users to make a personal copy of the article for noncommercial, educational or research purposes.

However, as a contributing author, you retain copyright to your article; ACM will refer requests for republication directly to you. Therefore, ACM is asking all newsletter authors to include their contact information in their submissions. Opinions expressed in articles and letters are those of the author(s) and do not necessarily express the opinions of the ACM or SIGMOD. Author(s) should be contacted for reprint authorization.

Editor-in-Chief:

Rada Chirkova, North Carolina State University, < rychirko AT ncsu.edu >

Associate Editors:

- Lyublena Antova (Industry Perspectives and Reports), Meta, < lyublena AT fb.com >
- Manos Athanassoulis (DBrainstorming), Boston University, < mathan AT bu.edu >
- Angela Bonifati (Research Highlights), Lyon 1 University, < angela.bonifati AT univ-lyon1.fr >
- Renata Borovica-Gajic (Surveys), The University of Melbourne, < renata.borovica AT unimelb.edu.au >
- Vanessa Braganholo (Distinguished Profiles), Universidade Federal Fluminense, <vanessa AT icc.uff.br >
- Aaron J. Elmore (Research and Vision columns), University of Chicago, < aelmore AT cs.uchicago.edu >
- George Fletcher (Research and Vision columns), Eindhoven University of Technology, < g.h.l.fletcher AT tue.nl >
- Wook-Shin Han (Research and Vision columns), POSTECH, < wshan AT dblab.postech.ac.kr >
- H.V. Jagadish (Distinguished Profiles), University of Michigan, < jag AT umich.edu >
- Alfons Kemper (Research Highlights), Technical University of Munich, <alfons.kemper AT tum.de>
- Benny Kimelfeld (Database Principles), Israel Institute of Technology, < bennyk AT cs.technion.ac.il>
- Samuel Madden (Research Highlights), MIT, <madden AT csail.mit.edu>
- Kyriakos Mouratidis (Research Centers), Singapore Management University, < kyriakos AT smu.edu.sg >
- Tamer Özsu (Advice to Mid-Career Researchers), University of Waterloo, < tamer.ozsu AT uwaterloo.ca >
- Kenneth Ross (Research Highlights), Columbia University, < kar AT cs.columbia.edu >
- Pınar Tözün (Reminiscences on Influential Papers), IT University of Copenhagen, < pito AT itu.dk >
- Immanuel Trummer (Research columns), Cornell University, < it224 AT cornell.edu >
- Yannis Velegrakis (Systems and Prototypes), Utrecht University, < i.velegrakis AT uu.nl >
- Ke Yi (Research Highlights), Hong Kong University of Science and Technology, < yike@ust.hk >

SIGMOD Record (ISSN 0163-5808) is published quarterly by the Association for Computing Machinery, 1601 Broadway, 10th Floor, New York, NY 10019-7434. Periodicals postage paid at New York, NY 10001, and at additional mailing offices.

POSTMASTER: Send address changes to SIGMOD Record, ACM, 1601 Broadway, 10th Floor, New York, NY 10019-7434.