

# Biographies of the Editors and Contributors

## Editors

**Daniel Sui** is professor of geography and distinguished professor of social and behavioral sciences at the Ohio State University. He also serves as chair of geography (since July 2011) and director of the Center for Urban and Regional Analysis (CURA) (since July 2009). Sui holds adjunct professorship at the John Glenn School of Public Affairs, Knowlton School of Architecture (the City and Regional Planning program), and College of Public Health at OSU. Prior to assuming his position at OSU in July 2009, Sui was professor of geography (1993–2009) and holder of the Reta A. Haynes Endowed Chair (2001–2009) at Texas A&M University. He holds a BS (1986) and MS (1989) from Peking University and PhD from University of Georgia (1993). His current research interests include geographic information science, urban geography, and geographic thought. Sui has authored/coauthored 4 books and over 100 articles in these areas. Sui was a 2009 Guggenheim Fellow. He is also a current member of the US National Mapping Science Committee and serves as editor in chief for *GeoJournal*.

**Sarah Elwood** is professor of geography at the University of Washington. She received a BA in Geography from Macalester College in 1994 and an MA and PhD in Geography from the University of Minnesota in 1996 and 2000. Her recent research bridges critical GIS, urban political geography, qualitative methods, and participatory action research, including a long-term collaborative project on the use and impacts of geographic information systems and GIS-based spatial knowledge in neighborhood revitalization, and a coedited volume on qualitative GIS. She is currently concluding a 3-year project on interactive mapping technologies in collaborative learning and civic engagement with young teens, and beginning research on the spatial politics of poverty and class identities in economic crisis and recovery.

**Michael F. Goodchild** is Jack and Laura Dangermond professor of geography at the University of California, Santa Barbara, and director of UCSB's Center for Spatial Studies. He received his BA degree in Physics from Cambridge University

in 1965 and his PhD in Geography from McMaster University in 1969 and has received four honorary doctorates. He was elected to be a member of the National Academy of Sciences and Foreign Member of the Royal Society of Canada (2002), member of the American Academy of Arts and Sciences (2006), and Foreign Member of the Royal Society and Corresponding Fellow of the British Academy (2010), and in 2007, he received the Prix Vautrin Lud. He serves on the editorial boards of ten journals and book series and has published more than 15 books and 400 articles. His current research interests center on geographic information science, spatial analysis, and uncertainty in geographic data.

## Contributors (By Alphabetical Order of Last Names)

**Benjamin Adams** is a PhD candidate in the Department of Computer Science at the University of California, Santa Barbara, and a member of the Spatial Cognitive Engineering (SpaCE) Lab. His research is concerned with developing new computational methods to organize and represent geographic knowledge drawn from heterogeneous data sources in order to aid both humanistic and scientific inquiry. This research touches on both the practical development of tools and methods for exploring and synthesizing these data as well as theoretical issues regarding the representation of geospatial data semantics. Benjamin is the program manager for the Cognitive Science program at the University of California, Santa Barbara. He received his MA in Computer Science from the University of California, Santa Barbara (2011), and BA (*summa cum laude*) in Social Science and Computer Science from Eastern Michigan University (2006). He was an NSF Integrative Graduate Education and Research Trainee in Interactive Digital Multimedia from 2007 to 2009.

**Thomas Bartoschek** is a doctoral student at Institute for Geoinformatics, University of Münster, Germany, where he leads the GI@School initiative (<http://www.gi-at-school.de>) in its 6th year. In his PhD studies, he is doing research on geospatial learning and thinking with geotechnologies and on GIScience education. Volunteered geographic information plays a key role in his scientific and professional work. Several prototypes of applications for geospatial learning, which he has developed or supervised, were based on VGI or made for the production of VGI in educational contexts. In teaching, especially in his K-12 education efforts and teacher trainings, he “evangelizes” the use and collection of VGI and has reached thousands of students and teachers over the last years. Thomas is also involved in the organization of the Vespucci Summer Institute on Geographic Information Science (<http://vespucci.org>).

**T. Edwin Chow** is an assistant professor in the Department of Geography at Texas State University–San Marcos. He holds a PhD in Geography from the University of South Carolina. His research interests focus in Internet GIS, volunteered geographic information (VGI), and GIS-based modeling. His recent passion in research related to spatial demography is to investigate the potential of Web demographics to unearth spatial patterns of population dynamics. His other work involves a broad spectrum of GIS-based modeling, including site assessment, quality of life, risk assessment,

hydrology, and wildland fire. He has been working on several collaborative research projects to model raccoon habitats and conduct ecological risk assessment, associate precipitation and surface runoff with ENSO periods, and simulate wildfire behavior in grassland ecosystems. Edwin teaches GIS at all levels (i.e., undergraduate, masters, and doctoral) as well as a graduate course in quantitative methods. He has the pleasure to mentor, and learn a lot more from, several masters and PhD students. He has also been serving as an ad hoc reviewer for many GIScience journals (e.g., *IJGIS*) and the NSF grant proposals.

**David J. Coleman** is dean of engineering and professor of geomatics engineering at the University of New Brunswick in Canada. Prior to obtaining his PhD, he spent 15 years in the Canadian geomatics industry – first as a project engineer, then as an executive with one of Canada’s largest digital aerial mapping companies, and later as an owner and partner in a GIS and land information management consulting firm. The former chair of UNB’s Department of Geodesy and Geomatics Engineering, Dr. Coleman has authored over 150 publications and reports dealing with land information policy development, geomatics operations management, geographic information standards, and spatial data infrastructure. He is a fellow of the Canadian Academy of Engineering, a past member of the GEOIDE Research Network Board of Directors, a former president of the Canadian Institute of Geomatics, and president-elect of the Global Spatial Data Infrastructure Association.

**Jon Corbett** is an assistant professor in the Community, Culture and Global Studies Department at UBC Okanagan and the codirector of the Centre for Social, Spatial and Economic Justice. He has three primary research interests: firstly, to explore how digital multimedia technologies can be combined with maps and used by people to document, store, and communicate their spatial knowledge; secondly, to examine how geographic representation of this knowledge using these technologies can strengthen community internally as well as externally by increasing people’s influence over decision-making processes; and, thirdly, to address the process and implementation of sustainable development, particularly with respect to community-based resource management. All aspects of his research incorporate a core community element. Within the context of his research program, this means that the research is of tangible benefit for the communities with which he works, that those communities feel a strong sense of ownership over the research process, and that community members are engaged by and engage in the research endeavor.

**Nicolás di Tada** spends most of his time designing and managing software projects. Before starting his company, Manas Technology Solutions, Nicolás spent 10 years as a software architect and project leader for many organizations, including start-ups and large corporations, acquiring a background in information retrieval, machine learning, information visualization, and Web development. During the last 7 years, he founded two other companies in the fields of e-learning and consumer-end social applications and guided several development teams through a wide variety of projects ranging from digital photogrammetry and biomedical signal processing to enterprise applications. Both for small start-ups and Fortune 500 companies, his teams have always proudly delivered usable and effective software on time. Passionate about the convergence between technology, science, and art to make a better world,

Nicolas currently leads the design and development of InSTEDD's software platform, coordinating the distributed development team, open-source contributors, interns, and volunteers.

**Michael W. Dobson** is president and principal consultant for TeleMapics LLC. He provides strategic and technical consulting to national and international clients involved in mapping, local search, location-based services, navigation, and telematics. His blog "Exploring Local" is widely read by members of the community interested in maps and mapping. He was previously employed as the CTO and executive vice president of technology for go2 Systems where he served as the corporate officer responsible for technology, software engineering, IT, and product development. go2 supplied location services, including mapping and routing to major wireless carriers and services, such as MSN Wireless, AT&T Wireless, Sprint, Nextel, Verizon Wireless, and others. Earlier, Dobson was the chief technologist and chief cartographer for Rand McNally, where he managed the technology and software development organizations supporting the company's map-based commercial and consumer products and services. He also served as the company's vice president of business development and public relations spokesperson. Dobson began his professional career with the Geography Department at the State University of New York at Albany where he was an assistant and then associate professor.

**Rob Feick** is an associate professor in the School of Planning at the University of Waterloo. His research focuses broadly on the application of spatial information technology to assist decision making and public participation in land management and planning. His current research focuses on the development and evaluation of PPGIS, VGI, and Web 2.0 tools that facilitate citizen involvement in community planning contexts, spatial-decision-aiding methods such as GIS-based multicriteria analysis, and Web-based spatial data visualization.

**Marcus Goetz** is a research assistant at the GIScience group (Geoinformatics) at Heidelberg University since early 2010. He has a background in mathematics and computer science and holds a diploma degree in Computer Science from the Karlsruhe Institute of Technology (KIT). He is currently working towards his PhD at the University of Heidelberg. Among other things, his current research interests include 3D city models, CityGML, (3D) VGI, and OSM, as well as (3D) indoor routing and indoor LBS.

**Christopher Goranson** is the director of the Parsons Institute for Information Mapping at The New School. PIIM is a research, development, and professional services facility that specializes in data and knowledge visualization. Previous to working at PIIM, Chris was the director of the GIS Center within the Bureau of Epidemiology Services, NYC DOHMH. The GIS Center is tasked with providing centralized resources including training, consulting, map production, and geographic information analysis support to the department. Prior to joining the department in 2004, Chris worked for a professional services firm supporting various federal client GIS projects including those for the EPA, FHWA, GSA, and USGS.

**Muki Haklay** is professor of geographic information science in the Department of Civil, Environmental and Geomatic Engineering, University College London. He is the director of the UCL Extreme Citizen Science research group, which aims to allow any community, regardless of their literacy, to use scientific methods and tools to collect, analyze, interpret, and use information about their area and activities. His research interests include (1) public access and use of environmental information, (2) human-computer interaction (HCI) and usability engineering aspects of GIS, and (3) societal aspects of GIS use – in particular, participatory mapping and citizen science. He received his PhD in Geography from UCL and holds a BS in Computer Science and Geography and MA in Geography from the Hebrew University of Jerusalem.

**Darren Hardy** is a senior analyst for the Ocean Health Index project at the National Center for Ecological Analysis and Synthesis, UC Santa Barbara. His research interests include spatial analysis, open scientific computing, distributed systems, and technology and society. He earned his PhD (2010) and Masters (2005) in Environmental Science & Management at the Bren School, UC Santa Barbara. His interdisciplinary dissertation examines the production and use of volunteered geographic information in Wikipedia. He has over 20 years of professional experience in roles for academia and industry, including the Harvest information discovery and access system (1995), an early Web search engine and proxy software (now Squid), and software engineering positions in Silicon Valley at Netscape Communications Corp., Affinia, Inc., and Napster, Inc. He also earned MS (1993) and BS (1991) degrees in Computer Science from the University of Colorado, Boulder.

**Francis Harvey** is an associate professor at the University of Minnesota. His research interests include location privacy, spatial data infrastructures, geographic information and sharing, semantic interoperability, and critical GIS. He serves on the editorial boards of the *International Journal for Geographical Information System*, *Cartographica*, *GeoJournal*, and the journal of the URISA. He published *A GIS Primer* with Guildford Press in 2008. He is currently finishing work on a long-term research project in Poland considering discrepancies between the cadastre and land use. He continues to work on SDI research, currently through an FGDC-supported project examining the return on investment for parcel data in regional data sharing (MetroGIS). He also contributed to the development of a model curriculum and resources for GIS ethics teaching ([gisprofessionalethics.org](http://gisprofessionalethics.org)).

**Bin Jiang** is professor in geoinformatics and computational geography at University of Gävle, Sweden. He is also affiliated to Royal Institute of Technology (KTH) at Stockholm via KTH Research School. He worked in the past with the Hong Kong Polytechnic University and the Centre for Advanced Spatial Analysis at University College London. He is the founder and chair of the International Cartographic Association Commission on Geospatial Analysis and Modeling. He has been coordinating the NordForsk-funded Nordic Network in Geographic Information Science. His research interest is geospatial analysis and modeling, in particular topological analysis of urban street networks in the context of geographic information systems.

He is currently an associate editor of the international journal *Computers, Environment and Urban Systems*.

**Peter A. Johnson** is a postdoctoral researcher and lecturer in the Department of Geography at McGill University, Montreal, Canada. In 2010, he completed his PhD in Geography, also from McGill University. For his dissertation, he developed an agent-based model to support the development of tourism planning scenarios. His research interests include the Geoweb, participatory GIS, and the use of geospatial technology in a community development context. In 2012, he will begin an appointment as assistant professor in the Department of Geography and Environmental Management at the University of Waterloo in Waterloo, Ontario.

**Carsten Keßler** (<http://carsten.io>) is a postdoc researcher at Institute for Geoinformatics, University of Münster, Germany, where he has been working in the Semantic Interoperability Lab (MUSIL) for several years. He has done research on context-aware information retrieval on the Semantic Web during his PhD studies. Volunteered geographic information has been one of his focus topics in teaching and research over the last years, with a strong focus on the semantics of VGI. His recent work focuses on the development of provenance-based measures of trustworthiness for VGI. His other research interests are in the areas of geosemantics, linked data and semantic technologies, context modeling, and collaborative and participatory geographic information systems. Carsten has co-organized a number of workshops and conferences, and he currently coordinates the University of Münster's Linked Open Data initiative (<http://lodum.de>).

**Scott Kraushaar** graduated from the University of Missouri–Columbia with an MA in 2011. Scott's thesis research focuses on volunteered geographic information and storm chasing including motivations for reporting, observing, and documenting storm reports. Scott has an interest in meteorology and recreational storm chasing and has been observing/spotting storms since the late 1990s. He is currently employed with the United States Department of Defense. In his spare time, Scott has been known to travel great distances in pursuit of rotating supercell thunderstorms and tornadoes.

**Wen Lin** has been a lecturer at the School of Geography, Politics and Sociology at Newcastle University in Newcastle upon Tyne, UK, since spring 2012. Prior to taking her current position, Wen was an assistant professor in the Department of Geography and Earth Science at University of Wisconsin–La Crosse (2009–2012). Her research interests include critical GIS, public participation GIS, and urban geography. Her main research centers on examining the intersection between the development and usage of geospatial technologies and the sociopolitical conditions in which these practices are situated. In particular, she has worked on three related themes: investigating the sociopolitical implications of recent mapping practices combined with Web 2.0 technologies, examining GIS-related practices in China's urban planning agencies, and examining public participation GIS practices in urban governance.

**Grant McKenzie** is a second year PhD student in the Department of Geography at the University of California, Santa Barbara. He holds a Master of Applied Science degree from the University of Melbourne (2008) and an Advanced Diploma in Geographic Information Science from the British Columbia Institute of Technology (2004). During his time in Melbourne, Grant was the recipient of the J H Mirams Memorial Research Scholarship and was awarded a Google Doctoral Colloquium Award and Scholarship for promising research proposal at the 2007 Conference on Spatial Information Theory (COSIT 2007). Prior to starting his PhD, Grant was a founding member of the Seattle-based start-up Spatial Development International and worked as a geospatial software developer for the engineering consulting firm CH2M HILL. Grant completed his BA in Geography at the University of British Columbia in 2002.

**Mark H. Palmer** is an assistant professor of geography at the University of Missouri–Columbia. His current research interests focus upon the social aspects of geographic information systems including the uneven development of geographic information networks within government agencies and their connections/disconnections within local and indigenous communities in North America. Palmer is also interested in understanding the dynamic interfaces between local knowledge systems, the geosciences, and digital technologies like GIS, in hopes of determining how elements of culture like language, storytelling, education, and performance influence the use and understanding of geographic information. Since moving to the forested hills of Missouri, Palmer has officially retired from amateur storm chasing.

**Barbara S. Poore** is a research geographer in the Center of Excellence in GIScience at the US Geological Survey specializing in volunteered geographic information and the use of social media in crowdsourced mapping. She has an AB in Art History from Wellesley College, an AM in Art History from Brown University, and a PhD in Geography from the University of Washington. Before embarking on a research career, Barbara worked for the Federal Geographic Data Committee during the establishment of the National Spatial Data Infrastructure. She lives and works by the bay in Saint Petersburg, FL.

**Stéphane Roche** is a professor of geographical information sciences in the Département des sciences géomatiques at the Université Laval, Québec, Canada. Stéphane is a surveying engineer (ESGT, France). He did a Masters in Planning and a PhD in Geography in the University of Angers (France). He is mainly interested in the analysis of the relationships between space and society with regard to the development process of the GeoWeb 2.0 and in the design of geospatial collaborative solutions (participatory GIS, WikiGIS) to address participatory geodesign practices. Stéphane coordinated with Claude Caron (University of Sherbrooke) for the book “Organizational Facets of GIS,” published in 2009 by John Wiley and Sons. He was also (with Rob Feick, University of Waterloo) guest editor of the *Geomatica* special issue (vol. 64, n. 1) on volunteered geographic information. He is currently guest editor (with Mike Goodchild, University of California, Santa Barbara) of the special issue on geodesign of the *International Journal of Geomatics and Spatial Analysis*.



**Renee E. Sieber** received her PhD from Rutgers University and is currently an associate professor at McGill University in Montreal, Canada. Her prime research focus is public participation geographic information systems (PPGIS), the methods by which those who are marginalized from public policy can use computational mapping and spatial databases to better participate in policy making. These individuals may be inner city or indigenous peoples. She brings to this a background as a community organizer and activist as well as a computer programmer. She increasingly researches PPGIS on the geospatial Web 2.0 (Geoweb). Her research areas are diverse. She leads a team of 10 researchers in the use of the participatory Geoweb for global environmental and climate change. She also conducts research in the digital humanities. She organized the first public participation GIS conference. She cofounded the GIS specialty group of the Canadian Association of Geographers and co-organized Spatial Knowledge and Information Canada, the first academic GIS conference in Canada.

**Jim Thatcher** is a PhD candidate in Geography at Clark University. His research focuses on the intersection of global capitalist systems and mobile geospatial technology. As the use of mobile geospatial technologies rises, what is known, what can be known, and what can be done all shift for both the individual and the state. Jim's research focuses on how programmatic decisions can delimit the episteme of the end user. He can be followed on twitter @alogicalfallacy.

**Sayone Thihalolipavan** worked with Christopher Goranson on alcohol-related mapping projects in the past. He currently serves as the director of the Cessation Unit at the Bureau of Chronic Disease Prevention and Tobacco Control at NYC Department of Health and Mental Hygiene. He advises on BTC's policy, clinical, and educational interventions, ensuring conformity with current evidence and best practices as well as helping to devise innovative strategies to deliver population cessation interventions through direct mail, the internet, email, text messaging, and other media including the annual nicotine and gum program which gives and serves about 40,000 New Yorkers annually. He also oversees the employee smoking cessation clinic for any NYC government employee.

**Eric B. Wolf** has worked for over two decades in the software industry and is a geographer in the Center of Excellence in GIScience at the US Geological Survey. He does research on integrating citizen contributions into *The National Map*. Eric has a BS in Applied Mathematics from the University of Tennessee at Chattanooga and an MS in GIScience from Northwest Missouri State University. He is currently a doctoral candidate at the University of Colorado at Boulder under the advisement of Dr. Barbara P. Buttenfield. His dissertation is focused on the structure of meta-data for spatial data infrastructures that include volunteered geographic information. Eric and his wife, Asha W. Wolf, live in Longmont, Colorado, with their dog and two cats.

**Alexander Zipf** is chair of GIScience (geoinformatics) at Heidelberg University since late 2009 and is a member of the Interdisciplinary Center for Scientific Computing (IWR), the Heidelberg Center for the Environment (HCE), and the



Department of Geography. He has previously been chair of cartography at University of Bonn and, earlier, was professor for applied computer science and geoinformatics at the University of Applied Sciences in Mainz, Germany. He has a background in mathematics and geography and finished his PhD at the EML European Media Laboratory in Heidelberg. Current research interests include among others 3D GIS, Spatial Data Infrastructures 2.0, as well as volunteered and crowdsourced geoinformation or location-based services (<http://giscience.unihd.de>).

# Index

## A

Aboriginal knowledge, 233–236  
Aboriginal people, 224, 229  
Absolute space, 135, 136  
Accuracy, 8, 20, 22, 33, 39, 40, 58, 67, 70, 73, 74, 79, 98, 111–116, 161, 162, 189, 233, 236, 251, 258, 259, 266, 267, 271, 273, 275–277, 279, 281, 282, 297, 302, 307, 310–315, 317, 325, 332, 335, 348  
Action, 34, 69, 71, 74–78, 109, 161, 162, 164, 165, 168–171, 194, 226, 289, 290, 293, 294, 296, 298, 308, 365, 367, 370  
Active community input, 309–311, 314  
Active contribution, 112, 258, 268, 269, 311–314  
Activity topic, 208  
Actor, 133, 165, 179, 288, 290, 292, 296  
Actor-network theory (ANT), 8, 287–304, 370  
Address, 2, 9, 26, 32, 66, 69, 73, 76, 78, 85–87, 89, 92, 94, 95, 97, 98, 128, 132, 136, 148, 162–165, 167, 170, 171, 178, 180, 183, 184, 189, 191, 192, 194, 195, 232, 251, 256, 258, 266–268, 270–276, 278, 289, 310, 313, 325, 330, 332, 334–336, 338, 343, 344, 362–364  
Adoption, 7, 39, 52, 65–79, 170, 258, 330, 339, 375  
Aerial surveys, 248  
Aeronautical charts, 247  
Aggregate, 22, 33, 34, 57, 134, 161, 204, 207, 209, 212, 228, 232, 280, 282, 331, 332, 336  
Alcohol, 331, 332, 335

Alcoholics Anonymous meeting, 335  
Amazon.com, 48, 56  
Android, 168–170, 348  
Anonymity, 193  
Anonymizing, 193  
Anonymous users, 184  
ANT. *See* Actor-network theory (ANT)  
Artificial intelligence, 127  
Attributes, 37, 39, 46, 47, 58, 60, 141, 143–148, 156, 226, 245, 246, 249, 252, 257–259, 266, 271, 272, 276, 280, 281, 304, 310–312, 317, 318, 321, 325, 330, 332, 334, 363  
Authoritative data, 72, 79, 247–248, 252, 314, 321, 370  
Authoritative GI, 16, 18–25  
Authoritative knowledge, 229, 232  
Authority, 61, 68, 252, 301, 319  
Authorship, 8, 175–195, 204

## B

Bacon numbers, 133  
BADUPCT. *See* Bureau of Alcohol and Drug Use, Prevention, Care and Treatment (BADUPCT)  
Behavior, 48, 61, 132, 135, 177, 187, 189, 193–195, 224, 278, 280, 309, 312, 331, 332, 335, 337, 352, 364, 370  
Big data, 2–9, 333, 371, 372  
Bing, 4, 141, 147, 153, 163, 228, 258, 259, 330  
    aerial imagery, 4, 143, 147, 258, 311  
    maps, 4, 56, 141, 147, 153, 163, 228, 330  
Blog. *See* weblog  
Border numbers, 133

- Bots, 177, 178, 180, 184, 191, 192  
 Bottlenecks, 44, 78, 164, 166, 171  
 Bottom-up ontology, 55, 58  
 Boundaries, 16, 75, 86, 88, 97, 98, 100, 106,  
     107, 134, 190, 191, 207, 225, 292,  
     310, 324, 332, 333, 336, 363,  
     366, 368  
 Boundary, 75, 190, 324, 332, 336  
 British Columbia, 223, 230, 232  
 British Columbia Treaty Process, 234  
 Bruno Latour, 289  
 Building footprints, 148–154, 249  
 Building generation, 150  
 Built environment, 331  
 Bureau of Alcohol and Drug Use,  
     Prevention, Care and Treatment  
     (BADUPCT), 331
- C**
- Cadastral, 17, 247  
 Callon, Michel, 289, 290  
 Canada, 19, 226, 228, 229, 234, 247,  
     250, 313  
 Carrier IQ, 335  
 Cartographer, 10, 226, 227, 293, 309  
 Casual geographers, 309  
 Cathedral and bazaar, 25  
 Center of calculation, 288, 292–294,  
     300–303  
 Changeset, 56, 57  
 Charting, 246  
 Chief Privacy Officer, 337  
 China, 7, 83–100, 216, 362, 367  
 Citizen participation, 7, 65–68, 73, 78, 84, 85,  
     91, 92, 100  
 Citizens, 2, 19, 35, 46, 65, 84, 109, 165, 228,  
     245, 267, 288, 363  
     science, 2, 7, 84, 86, 105–120  
     scientist, 66, 115, 118, 119,  
     297–299, 368  
     weather observers, 295  
 Citizenship, 7, 85, 90–92, 98, 100, 281  
 Civic engagement, 85, 90, 99, 100, 367  
 Clearinghouse, 44, 47, 537  
 Cloud, 2, 3, 20, 56, 69, 128, 177, 208, 232,  
     259, 298, 302, 330, 372  
 Cloud computing, 2, 3, 128, 259  
 Clustering algorithm, 134  
 Collaboration, 19, 60, 76, 77, 94, 118–120,  
     126, 178, 195, 230, 234, 248, 308,  
     330, 343, 368  
 Collective action, 194, 308, 367  
 Collective authorship, 175–179, 194  
 Colonization, 229
- Communication, 6, 9, 21, 26, 44, 45, 58,  
     65–68, 78, 85, 89–91, 93–98, 100,  
     106, 109, 111, 118, 171, 176, 178,  
     180, 193, 195, 224, 227–229, 234,  
     237, 238, 257, 266, 295–299,  
     301, 302  
 Communities of users, 44, 46, 49  
 Community, 3, 17, 45, 68, 84, 107, 127,  
     139, 177, 223, 248, 267, 309, 331,  
     344, 372  
 Community-based research (CBR), 230  
 Computational geography, 7, 125–136, 361  
 Computational social science, 127  
 Confidential, 18, 24, 273, 280, 310, 333–335  
 Connection to the land, 237  
 Constraints, 7, 47, 67–70, 72, 74–76, 78, 136,  
     155, 166, 193, 251, 325, 365  
 Constructionism, 259  
 Constructivism, 359  
 Content Standard for Geospatial Metadata  
     (CSDGM), 46, 47  
 Contestation, 85, 91, 92, 98  
 Contour, 53, 211  
 Contributors, 19, 23, 24, 26, 70–73, 76, 107,  
     112, 126, 141, 176–178, 182, 186,  
     193, 194, 228, 246, 250–252,  
     255–258, 268, 281, 309, 310, 312,  
     315–318, 323–326, 364, 366, 367,  
     369, 371  
 Conventional datasets, 248  
 Co-production of data, 44, 46  
 Corporate Spatial Data Library, 253  
 Credibility, 73, 236, 251, 252, 256, 258,  
     297, 300  
 Crenulation, 53, 54  
 Crisis  
     camps, 55  
     mapping, 20, 92, 94, 161  
     response, 8, 162, 164–167, 170, 171  
 Critical GIS, 67, 85, 87, 99  
 Crowdsourced, 2, 7, 16, 31–40, 45, 58, 66, 76,  
     135, 204, 310–324, 367  
     compilation systems, 310, 315, 316, 319  
     data, 2, 7, 16, 31–40, 204, 312, 314, 315,  
     317–319, 324, 325  
     geodata, 139–158  
 CSDGM. *See* Content Standard for Geospatial  
     Metadata (CSDGM)  
 CUNY School of Public Health–Hunter  
     College, 331  
 Curators, 47  
 Curriculum, 343–350, 357  
 Cyber infrastructure, 2, 9, 52, 278, 372  
 Cyborg, 87, 88, 288  
 Cycle of accumulation, 293

**D**

3D. *See* Three-dimensional (3D)  
 Data extraction, 183, 184, 269  
 Data infrastructure, 366  
 Data integration, 47, 191, 192  
 Data-intensive computing, 126, 127, 133  
 Data mining, 127, 178, 180, 181, 184,  
     192–194, 202, 204, 270, 280, 314,  
     321, 322  
 Data quality, 22, 23, 32, 38–40, 47, 52, 60, 73,  
     74, 76, 106, 113, 235, 247, 251,  
     307–310, 312, 313, 315–321, 325,  
     339, 358, 364, 369  
 Data sharing, 45, 191  
 Data spam, 310, 325  
 DE. *See* Digital earth (DE)  
 Death of distance, 9–10  
 Decision-making, 18, 19, 65–69, 72–79, 87,  
     109, 115, 126, 162, 165, 171, 224,  
     227, 230, 278, 298  
 De-identification, 336–338  
 Densification, 53  
 Dérives, 7, 25, 27  
 Dialogue, 77, 224, 232, 235, 268, 290, 303, 367  
 Diaspora, 193, 223, 235  
 Diffusion, 77, 90, 187  
 DigiPlace, 87–89, 92, 98–100  
 Digital commons, 176, 195  
 Digital divide, 1–10, 99, 100, 269, 280, 288,  
     370, 371  
 Digital earth (DE), 4  
 DigitalGlobe, 55  
 Digital line graphs (DLGs), 53  
 Digital map maintenance, 248  
 Digital terrain model (DTM), 143, 146, 148  
 Digital traces, 193, 280  
 Direct observation, 311  
 Discourse, 7, 16, 85, 90, 91, 266, 278, 280,  
     301, 363  
 Displacement, 225, 226, 278  
 Distance decay, 8, 182, 184, 187, 188  
 Distribution of volunteers, 316  
 Division of labor, 317  
 DLGs. *See* Digital line graphs (DLGs)  
 Domestic violence, 335  
 3D-SLD. *See* 3D styled layer descriptor  
     (3D-SLD)  
 DTM. *See* Digital terrain model (DTM)  
 Dublin Core, 179

**E**

Edit wars, 192, 194  
 Education, 3, 9, 25, 111, 112, 119, 280, 281,  
     297, 317, 334, 341–359, 361

E-governance, 66, 68, 91  
 Embedded metadata, 48–49  
 Entropy, 205, 209–211, 215  
 Erosion, 68, 71, 75, 238, 266  
 Error, 20, 22, 56, 61, 72–74, 95, 235, 251, 266,  
     268, 275, 276, 307, 310–316, 318,  
     319, 321, 323, 364  
 eScience, 2, 37, 126, 127, 371  
 Esri, 54  
 Ethics, ethical problems, 17, 33, 35, 334, 337  
 Exaflood, 1–10  
 Exploitation, 88, 333, 337  
 Exploratory analysis, 206, 211  
 Exponential, 61, 126, 130, 182, 187, 188,  
     209, 335  
 Exponential decay, 182, 187, 209  
 eXtensible Markup Language (XML), 49, 50,  
     56, 111, 163, 348, 349

**F**

Facebook, 3, 5, 24, 71, 136, 261, 271, 299,  
     301, 372  
 Feature topic, 208  
 Federal Geographic Data Committee,  
     44, 46, 363  
 Federal Privacy Rule, 336  
 Field, 7, 8, 21, 23, 24, 27, 47, 52, 54, 59, 61,  
     72, 106, 111, 113, 125–128, 132,  
     161, 163, 187, 207, 211, 228, 249,  
     253, 256, 273, 275, 277, 288,  
     294–299, 301–303, 312,  
     314, 331, 332, 345, 346,  
     349, 350, 359, 362  
 Findability, 44, 46, 49, 51, 52, 54,  
     55, 58, 59  
 First law of geography, 135, 209, 278, 365  
 Fitness-for-use, 6, 7, 16, 18, 22, 26, 33, 38–40,  
     52, 58, 315  
 Flickr, 3, 39, 136, 141, 180, 192, 304,  
     346, 350  
 Folksonomies, 52  
 Food Retail Expansion to Support Health  
     (FRESH), 333  
 Fourth paradigm, 9, 126, 361–372  
 FRESH. *See* Food Retail Expansion  
     to Support Health (FRESH)

**G**  
 Gazetteer, 58, 180, 191, 363  
 Geoblogosphere, 45  
 GeoChat, 331, 345  
 Geo-coding, 9, 207, 276, 334, 335  
 Geocomputation, 127

- Geo crowd sourcing
- GeoEye, 55, 56
- Geographic
- data, 1, 3, 18, 44, 60, 125, 140, 143, 180, 234, 273, 304, 313, 330, 332, 334, 335, 337, 345, 363
  - proximity, 334
  - effects, 182, 194
  - footprint, 334, 335, 338, 339
  - forms and processes, 127, 128, 135, 136
  - imagination, 133
- Geographic information (GI), 2, 15, 31, 45, 68, 106, 125, 161, 178, 202, 227, 246, 288, 308, 330, 341, 362
- Geographic information science, 114, 125, 202, 334, 362, 371
- Geographic information systems (GIS), 68, 106, 126, 204, 228, 303, 341, 363
- Geographic Names Information System, 58, 180
- Geoinformatics, 126–128, 136, 139, 345–348, 351, 357
- Geolive, 232, 234, 235
- Geomatics, 127
- Geometric center, 133
- Geometry, 128, 129, 140, 141, 143, 148–154, 156, 179, 309, 310, 322, 324
- Georeferencing, 179, 191, 192, 288, 300–302, 304
- (Geo)slavery, 24, 87, 269
- Geospatial, 3, 21, 44, 66, 85, 126, 162, 191, 228, 246, 269, 287, 330, 345, 371
- Geospatial metadata, 7, 44–46, 49, 58
- Geotag, 3, 4, 9, 20, 22, 34, 113, 141, 176, 179–184, 186, 189–192, 258, 288, 300, 302, 303, 346, 349–354, 356, 358
- Geotagging, 9, 179, 180, 190–192, 288, 300, 302, 346, 349, 352, 354, 356, 358
- GeoWeb, 2, 7, 16, 20, 24, 43–61, 66–71, 75, 84, 163, 223–238
- Gibbs sampling, 205, 208
- GIScience, 2, 9, 17, 45, 52, 125, 127, 128, 191, 192, 289, 343, 345, 351, 357, 362, 364, 371–372
- GIS professional, 44, 45, 50, 51, 337, 338
- Global positioning system (GPS), 3, 107, 109–112, 115, 116, 126, 140, 141, 143, 148, 163, 169, 192, 193, 228, 253, 258, 269, 288, 297, 299, 300, 302, 309, 310, 312, 314, 317, 330, 332, 334, 343, 344, 346–349
- Global scale, 4, 191, 194
- GMM. *See* Google MapMaker (GMM)
- Google, 3, 4, 10, 20, 33, 36, 37, 47, 51, 52, 54, 59, 74, 87, 88, 90, 92, 93, 97, 176, 228, 246, 256–259, 279, 308, 311–314, 321–324, 330, 333–335, 350, 352–354, 356, 358, 365, 372
- Google Earth, 4, 87, 88, 90, 92, 228, 313, 330
- Google MapMaker (GMM), 10, 36, 37, 59, 107, 245, 313, 322, 323, 365
- Google Maps, 3, 10, 20, 69–71, 74, 86, 88, 92, 93, 95–97, 126, 163, 169, 207, 228, 232, 245, 276, 312, 313, 321–323, 330, 345, 347, 350, 352
- Governance, 19, 66–70, 73, 74, 77–79, 90, 91, 368
- Government, 2, 15, 33, 51, 65, 93, 118, 136, 165, 223, 246, 266, 288, 311, 330, 366
- Government mapping agencies, 246, 248, 250
- GPS. *See* Global positioning system (GPS)
- GPS traces, 317
- Graduate studies, 9, 341–359
- Gravity model, 184–189
- Great circle distance, 189
- H**
- Haiti, 6, 20, 21, 46, 55, 56, 58, 59, 94, 164, 165
- Have2p, 6
- Head/tail division rule, 132
- Health Information Technology
- for Clinical and Economic Health (HITECH), 337
- Health Insurance Portability and Accountability Act (HIPAA), 336, 337
- Health, public health, 8, 126, 329–339, 345, 362
- Heavy-tailed distribution, 128, 130–133, 135
- High-performance computing, 127, 128
- HIPAA. *See* Health Insurance Portability and Accountability Act (HIPAA)
- HITECH. *See* Health Information Technology for Clinical and Economic Health (HITECH)
- HIV, 334, 335
- Homophile, 6
- HON Code of Conduct, 336
- Human geography topics, 204
- Human mobility patterns, 132

Humans as sensors, 287, 288, 298, 301  
 Human-sensors, 288, 291, 294, 295, 297, 298,  
 300, 301, 303, 304  
 Human subjects, 114, 337, 338  
 Hybrid map compilation, 315–319  
 Hydrography data, 53, 54

**I**

Identity, 73, 89, 100, 223, 224, 226, 233, 236,  
 237, 252, 279, 310, 335  
 Incentives, 22, 73, 334, 342, 349, 350, 354,  
 355, 358  
 Indirect observation, 311  
 Information field, 187  
 Information production, 176–178, 249  
 Informed consent, 337  
 Innovation, 9, 20, 24–26, 78, 187, 205, 294  
 InSTEDD, 331  
 Institutional review board (IRB), 336–339  
 Intellectual property, 229, 249  
 Intelligent crowd, 317  
 Interactive, 7, 44–46, 48–49, 59, 89, 98, 99,  
 176, 191, 192, 228, 256, 313  
 Intermediary, 59, 74, 237, 288, 290  
 Internet, 2, 21, 38, 44, 65, 84, 105, 176, 228,  
 266, 288, 309, 370  
 Internet censorship, 6, 85, 91, 92, 97  
 IP geolocation, 184, 185, 193  
 IRB. *See* Institutional review board (IRB)

**J**

Java, 347  
 Jensen-Shannon divergence, 205  
 Jumping scale, 74  
 Jurisdiction, 66, 68, 70, 74–76, 230, 245, 247,  
 248, 258, 259, 324

**K**

K-12, 341–359  
 Kernel density estimation (KDE),  
 211, 212  
 Keyhole Markup Language (KML),  
 78, 330, 347  
 Keyword, 47, 51, 52, 190, 270, 301  
 KML. *See* Keyhole Markup  
 Language (KML)  
 Knowledge production, 2, 7, 10, 85, 86, 88,  
 90, 92, 99, 100, 106, 118, 119, 176,  
 233, 372  
 Knowledge transfer, 229, 330  
 Kullback-Liebler divergence, 205

**L**

Ladder of participation, 115  
 Land claims, 224, 228, 231  
 Land management, 66, 71  
 Latent Dirichlet allocation (LDA), 8, 203–209,  
 215, 216, 219  
 Latitude, 25, 56, 179, 191, 207, 302, 335, 336,  
 363, 368  
 Latitude (Google), 207, 335  
 Law, John, 289  
 LDA. *See* Latent Dirichlet allocation (LDA)  
 Learning, 24–26, 53, 69–71, 117, 205, 228,  
 237, 270, 297, 342–347, 349,  
 357, 359  
 Lego block, 7, 24–27  
 Line, 38, 53, 86, 87, 119, 129, 188, 216, 252,  
 273, 299, 366  
 Linus's Law, 126, 364  
 Locality topic, 208, 216  
 Localization, 215–216, 252  
 Local knowledge, 66, 67, 72, 74, 86, 293,  
 300, 310, 311, 315–317, 321,  
 323, 325, 368  
 Local users, 310, 324  
 Location, 4, 20, 31, 46, 66, 84, 106, 129, 148,  
 162, 178, 202, 224, 251, 267, 297,  
 308, 330, 341, 363  
 Location-based services; location based  
 information, 2, 36, 46, 72,  
 163, 189, 316, 330–332, 335,  
 338, 341  
 Location entropy (of topic  
 distribution), 211  
 Lognormal, 130, 132  
 London underground map, 129  
 Longitude, 56, 179, 191, 207, 302, 335, 336,  
 363, 368

**M**

Maintenance, 8, 20, 70, 119, 224, 236,  
 248, 260  
 Mandate, 52, 69, 75, 77, 247, 248, 279, 307  
 Map compilation, 249, 307, 309–311,  
 313–326  
 Map-mediated dialogue, 232, 367  
 Mapping, 3, 16, 37, 45, 83, 107, 125, 141,  
 161, 176, 207, 224, 245, 266, 288,  
 307, 344, 365  
 party, 38, 39  
 topics, 214  
 Maps, 3, 20, 48, 68, 86, 112, 126, 140, 163,  
 176, 207, 226, 245, 276, 288, 307,  
 330, 344, 363

- MapShare, 253, 255–256  
 Maptivism, 86, 87  
 Markov chain Monte Carlo (MCMC), 205  
 Markup language, 47, 158, 179, 183, 192  
 Mashup, 26, 70, 86, 92, 95, 96, 126, 163, 192, 232, 266  
 MCMC. *See* Markov chain Monte Carlo (MCMC)  
 Measuring work (edit count), 193  
 Media, 5, 20, 34, 45, 71, 89, 112, 128, 177, 228, 246, 270, 288, 313, 330, 368  
 Medial axis, 133  
 MediaWikimetadata, 182  
 Memories, 224–226, 230, 231, 235–238  
 Metadata, 7, 38, 43, 168, 179, 257, 267, 325, 369  
 Metadata squared, 43–61  
 Metadata standards, 44, 47, 50, 52, 60, 191  
 Meteorologist, 288, 294, 296, 298–304  
 Microformat, 179  
 Microsoft, 4, 33, 228, 259, 308, 330, 334, 336  
 MINUSTAH. *See* United Nations Stabilization Mission in Haiti (MINUSTAH)  
 Mobile application, 278, 343  
 Mobile Device Privacy Act, 335  
 Mode of information, 85, 89–90, 98, 100  
 Motivations, 9, 19, 23, 24, 67, 68, 113, 114, 117, 251, 268, 277, 281, 304, 342, 349–351, 353, 357, 358, 363  
 Multimedia, 84, 232, 237, 270, 279, 370  
 Municipal government, 74, 75, 77  
 Murphy's law, 6
- N**
- Named streets, 131  
 National Hydrography Dataset, 54  
 National Institutes of Health, 337  
 National Map, 45, 46, 58, 125, 247, 253, 367, 368  
 National Map Corps, 253–255, 257  
 National Oceanic and Atmospheric Administration (NOAA), 296–298  
 National Science Foundation, 334, 342, 371  
 National Severe Storms Laboratory (NSSL), 295, 297  
 National Weather Service (NWS), 288  
 Natural cities, 133–135  
 Natural language, 201–219  
 Natural language processing (NLP), 202, 272, 369  
 Natural Resources Canada, 19  
 Natural streets, 131  
 Nautical charts, 247
- Navigation, 25, 34, 112, 129, 176, 256, 270, 307–326  
 NAVTEQ, 245, 246, 250, 256, 308, 311, 313, 314, 319, 320  
 NCGIA, 2  
 Nearness, 194  
 Neighborhood, 39, 167, 257, 278, 330–333, 344  
 Neocartography, 330  
 Neogeographer, 45, 46, 49–52, 60, 72, 372  
 Neogeographic datasets, 246  
 Neogeography, 2, 49, 50, 52, 59, 84, 92, 194, 246, 330  
 Neoliberalization, 66  
 NES. *See* Notification for Edit Service (NES)  
 Netizen, 91, 92, 99  
 Network, 8, 18, 25, 53, 55, 109, 111, 131, 132, 163, 193–195, 250, 253, 268, 273, 288, 290–292, 294–296, 298–300, 302, 304, 319, 326, 339, 346, 358, 359  
 Neutral point of view, 177  
 New media, 46, 47, 49, 78, 89, 90, 100, 194, 246, 368  
 New York City Department of Health and Mental Hygiene (NYC DOHMH), 331, 332  
 NLP. *See* Natural language processing (NLP)  
 NOAA. *See* National Oceanic and Atmospheric Administration (NOAA)  
 Non-expert, 45, 70, 72–74  
 Normal distribution, 130, 132, 135  
 Notification for Edit Service (NES), 253  
 NSERC. *See* Natural Sciences and Engineering Research Council of Canada (NSERC)  
 NSSL. *See* National Severe Storms Laboratory (NSSL)  
 NWS. *See* National Weather Service (NWS)  
 NYC Department of City Planning, 332, 333  
 NYC DOHMH. *See* New York City Department of Health and Mental Hygiene (NYC DOHMH)  
 NYC Economic Development Corporation, 333  
 NYC Projection Area, 332
- O**
- Object-level metadata, 55, 56, 281  
 Occupy wall street, 23  
 Office of the National Coordinator for Health Information Technology (ONCHIT), 336, 337



- OGC. *See* Open Geospatial Consortium (OGC)
- OLPC. *See* One Laptop Per Child (OLPC)
- ONCHIT. *See* Office of the National Coordinator for Health Information Technology (ONCHIT)
- One Laptop Per Child (OLPC), 347
- Online mapping, 45, 49, 84, 86, 87, 92, 99, 176, 180, 224, 312
- Ontology, 27, 52, 55, 58, 61, 168, 270
- OpenDataKit, 331, 335
- Open Geospatial Consortium (OGC), 143, 147, 148, 158, 330
- Open source, 20, 25, 45, 46, 51, 56, 60, 61, 77, 87, 93, 106, 162, 167, 170, 182, 232, 246, 257, 331, 344, 369
- OpenStreetMap (OSM), 7, 20–22, 25, 27, 32, 34, 37–39, 45, 52, 55, 59–61, 88, 100, 107, 112, 126, 128, 131, 134, 136, 140, 156–158, 161, 165, 245, 251, 255, 267, 269, 312, 315–317, 319, 323, 330, 342–343, 358–346, 351, 354, 357, 358, 365–367
- OpenTopography, 4
- Opportunity costs, 71
- Ordnance Survey, 248
- Organization, 18, 19, 21, 44, 46, 47, 52–55, 67–71, 75, 77, 78, 84–86, 91, 93, 98–100, 167, 171, 178, 202, 207, 227, 235, 245–251, 253, 255–260, 288, 289, 294, 296, 301, 307, 324, 337–339, 347, 368
- OSM. *See* OpenStreetmap (OSM)
- OSM-3D, 140, 143, 144, 147–150, 152, 154, 156–158
- P**
- Participation, 7, 16, 32, 56, 65, 83, 105, 140, 194, 225, 267, 288, 308, 338, 342, 367
- Participatory culture, 325–326
- Participatory geoweb, 226
- Participatory GIS, 106, 115, 119, 367
- Participatory mapping, 8, 83–100, 107, 224, 226–228, 232, 235, 236
- Participatory VGI, 84–86, 92, 100, 119, 358
- Passive community input, 309–310, 321, 325
- Passive contribution, 258, 269, 310, 321
- Peer production, 178
- People-finder sites, 266–268, 270–272, 275, 277, 280
- Personal health record (PHR), 336
- Personal location data, 4
- Personally identifiable information, 333–335, 338
- Personal travel history; travel paths, 334–336
- Photographs, 38, 84, 97, 98, 105, 126, 176, 230, 232, 233, 237, 304, 368
- PHR. *See* Personal health record (PHR)
- Physical geography topics, 215
- Place, 7, 16, 54, 66, 87, 112, 132, 142, 162, 176, 201, 223, 251, 266, 289, 311, 332, 349, 362
- Place-names, 215, 302, 363
- Platinal, 362–364, 367–370
- POI. *See* Point-of-Interests (POI)
- Point, 7, 19, 21, 35, 36, 51, 56, 88, 96, 111, 112, 141, 152, 176, 177, 179, 201, 207, 211, 212, 216, 225, 227, 234, 235, 251, 252, 258, 276, 318, 332, 334, 335, 342, 356, 363, 367, 369
- Point-of-Interests (POI), 142, 143, 148, 307, 343, 346
- Polygon, 141, 148, 179, 211, 212, 215, 300, 303, 330, 332
- Population dynamics, 266, 273, 279
- Portal, 3, 47, 237, 278, 343
- Positional accuracy, 22, 58, 189, 251, 252, 276, 307, 310, 315, 317
- Positioning, 251, 252, 343
- PostGIS, 2
- Power law, 6, 128, 130, 134, 135, 177
- Power law distribution, 128, 130, 134, 177
- Power relations, 7, 84–86, 100, 106, 115, 177
- PPGIS. *See* Public participation GIS (PPGIS)
- Precision, 20, 73, 113, 114, 192, 271, 272
- Privacy, 8, 17, 21, 24, 33–36, 39, 40, 67, 84, 86, 87, 193, 229, 232, 234, 247, 252, 266, 268, 269, 273, 279–282, 333–338, 354, 372
- policy, 36
- rule, 336–338
- Private good, 17, 18
- Private sector, 19, 87, 250, 258, 268, 369
- Privatization, 301
- Procedural extrusion, 153
- Producers, 249
- Producers, 22, 25, 164, 249
- Public good, 17, 18
- Public health, 8, 126, 329–339, 345, 362
- Public health researcher, 331, 333, 334, 339
- Public participation GIS (PPGIS), 7, 16, 23, 67, 68, 78, 83–100, 140, 194

Public sector, 4, 19, 21, 22, 246, 258–259  
 Public-sector mapping, 246, 258–259  
 Public sphere, 90, 92, 100, 118

## Q

Qualitative, 17–19, 45, 61, 73, 113, 128, 143, 145, 156, 164, 228, 232, 233, 235, 237, 276, 331, 356, 368–370  
 Qualitative information, 113, 143, 145, 231  
 Quality assurance, 247, 249–256, 272, 312, 362, 364, 365, 369  
 Quebec, 19, 67, 68, 75, 79

## R

Radar, 294, 295, 298, 300–303  
 Realistic 3D models, 143, 150  
 Region, 75, 140, 154, 190, 202, 207, 215, 231, 275, 295, 297  
 Regional geography, 184, 202  
 Registered users, 141, 232, 313  
 Relative entropy. *See* Kullback-Liebler divergence  
 Relative space, 135  
 Reliability, 236, 252, 256, 258, 259, 276, 295, 314, 367, 369  
 Representation, 8, 16, 84, 88, 89, 96, 98, 100, 130, 135, 162, 164, 165, 191, 207, 211, 218, 219, 227, 249, 251, 252, 257, 280, 288, 302, 303, 332, 344, 368–370  
 Research, 2, 17, 33, 44, 67, 84, 109, 126, 141, 162, 176, 202, 224, 251, 265, 287, 312, 331, 343, 361  
 Resistance, 68, 89, 91, 92, 97, 98, 226  
 Resource cost, 70, 71  
 Return on investment (ROI), 18–20  
 Revenge of geography, 9–10  
 Reverse geocoding, 334, 335  
 Revisions, 182–184, 188, 192, 249, 252, 253, 281, 312, 321, 322, 366  
 RFID, 3, 32  
 Risk, 25, 73, 88, 118, 250–257, 294, 334, 335, 337, 338  
 ROI. *See* Return on investment (ROI)  
 Routing, 130, 148, 258, 312

## S

Scale free, 130, 177  
 Scaling, 128–133, 135, 136, 279, 370  
 Scaling of geographic space, 128, 130, 132, 135

Science and technology studies (STS), 289  
 SDI. *See* Spatial data infrastructures (SDI)  
 Secondary school, 341–343  
 Self-synchronization, 309, 318  
 Semantic similarity. *See* Similarity  
 Semantic Web, 2, 170, 270  
 Sense of place, 8, 176, 203, 204, 209, 223–238  
 Sensor network, 3, 46, 295, 298  
 Sensors, 3, 34, 46, 66, 289, 295, 298, 301, 304, 311  
 Sentinel, 333, 335  
 Serendipity, 25, 27  
 SES. *See* Socioeconomic Status (SES)  
 Severe weather, 288, 292–304  
 Short message service (SMS), 20, 39, 331, 347  
 Signature distance, 183, 188–190, 193  
 Similarity, 8, 115, 193, 205, 209, 210, 217, 218, 272, 273  
 Simulation, 89, 127, 128, 136, 208, 212, 216, 290, 292–294  
 Situated knowledge, 53  
 Situated learning, 53, 359  
 Six degrees of separation, 5  
 Six Rivers National Forest, 53, 54  
 SKYWARN, 294, 297  
 Smart phones, 2, 3, 7, 32, 33, 163, 193, 297, 330, 331, 335, 336, 343, 348, 350  
 SMS. *See* Short Message Service (SMS)  
 SNI. *See* Supermarket need index (SNI)  
 Snow, John, 334  
 Social capital, 233  
 Social economy, 79  
 Social media, 5, 71, 128, 135, 136, 281, 298, 368  
 Social networking, 34, 55, 67, 92, 93, 96, 98, 228, 233, 252, 267, 268, 277, 279, 290, 301, 304, 308  
 Social networking sites, 34, 92, 93, 96, 98, 252, 268, 279, 301, 304  
 Social networks, 23, 34, 52, 55, 67, 92, 93, 96, 98, 193, 195, 228, 233, 234, 250, 252, 266–268, 277–279, 290, 301, 304, 308, 326, 350, 358, 359  
 Social security number, 339  
 Socioeconomic Status (SES), 193, 331  
 Software-as-a-service (SaaS), 69  
 Space, 7, 8, 21, 25, 86, 89, 126, 128, 130, 132, 135, 136, 140, 147, 162–166, 169, 176, 189, 202, 203, 219, 278, 289,

- 292, 295, 298, 302, 309, 344, 362–364
  - Space-time convergence, 5
  - Spatial analysis, 70, 71, 126, 193, 207, 276, 370
  - Spatial autocorrelation, 135, 203
  - Spatial century, 9
  - Spatial data infrastructures (SDI), 6, 16, 18, 19, 44–46, 51, 52, 61, 66, 158, 178, 191–193, 369
  - Spatial data mining, 193
  - Spatial data quality, 22, 106, 315
  - Spatial footprint, 184–188
  - Spatial heterogeneity, 130, 135, 202
  - Spatial information theory, 127, 187
  - Spatial interaction model, 184, 187
  - Spatial pattern, 182, 184, 194, 277
  - Spatial resolution, 300–303
  - Spatial Thinking, 135, 342, 343
  - SPC. *See* Storm Prediction Center (SPC)
  - SPOT map, 334
  - Spotter Network, 294, 299, 301
  - State control, 85, 91, 92, 100
  - State of Victoria, Australia, 253
  - STD, 335
  - Storm Prediction Center (SPC), 297
  - Straight skeleton, 153
  - Strategic planning, 69
  - Street block, 132–133
  - Street nodes, 134
  - Streets, 23, 45, 55, 71, 126, 129–135, 141, 142, 147, 155, 193, 211, 218, 267, 271, 272, 275, 279, 310–312, 322, 324, 325, 330, 334, 336, 363
  - Strengths, Weaknesses, Opportunities, and Threats (SWOT), 6
  - Subjectivity, 85, 88–90, 252
  - Supermarket need index (SNI), 333
  - Survey, 4, 9, 97, 105, 107, 108, 193, 248, 253, 268, 270, 273, 275–279, 293, 312, 313, 331, 332, 335, 342, 346, 350–358, 364
  - SWOT. *See* Strengths, Weaknesses, Opportunities, and Threats (SWOT)
  - Symbology, 93, 96, 344
  - Synthesis hybridity, 368–370
- T**
- Tag, 56–58, 177, 288, 348, 349
  - TeleAtlas, 256, 257, 308, 313
  - Templates, 90, 179, 180, 183
  - Temporal
    - data, 335, 338
    - proximity, 334
  - Temporal analysis, 203, 216–217
  - TerraServer, 4
  - Text analysis, 206
  - Thematic geography, 202
  - Third dimension, 139–158
  - Three-dimensional (3D), 7, 140, 141, 143, 144, 146–150, 152–158, 176
    - building models, 143, 148–150, 153, 156
    - city models, 141, 156
    - navigation, 176
    - routing, 148
    - VGI, 156
  - 3D styled layer descriptor (3D-SLD), 148
  - TIGER. *See* Topologically integrated geographic encoding and referencing (TIGER)
  - Time-space compression, 4, 5
  - Time-space distancing, 4
  - TIP. *See* Tornado Intercept Project (TIP)
  - Tlowitsis Nation, 223, 224, 226, 230, 232
  - Tobler's first law, 203, 209, 278
  - Tobler's First Law of Geography, 203, 209, 278
  - TomTom, 20, 245, 246, 250, 253, 255–256, 258, 308, 310, 313, 314
  - Top-down schema, 58
  - Topic model, 8, 202–206, 208, 217
  - Topic trend, 217
  - Topographic, 8, 40, 53, 135, 230, 245–260, 308, 312
  - Topological center, 133
  - Topologically integrated geographic encoding and referencing (TIGER), 129, 269
  - Topology, 128–131, 136
  - Toponym, 180, 191, 278
  - Tornado, 294–296, 298–303
  - Tornado alley, 295
  - Tornado Intercept Project (TIP), 295
  - Totable Tornado Observatory (TOTO), 295
  - TOTO. *See* Totable Tornado Observatory (TOTO)
  - Translation, 53, 78, 97, 288, 290–292, 294, 298–300, 302–304
  - Trust, 38, 56, 61, 79, 97, 108, 112, 114, 115, 170, 234, 236, 249–252, 256, 275, 279, 311, 312, 314, 319, 322, 323
  - Twitter, 3, 37, 70, 71, 73, 95–97, 136, 202, 299, 301, 302, 370

**U**

- Uncertainty, 22–24, 26, 27, 114, 120, 273, 364, 378
- Undergraduate students, 296, 357
- United Nations Stabilization Mission in Haiti (MINUSTAH), 59
- United States Geological Survey (USGS), 2, 45, 53, 58, 61, 253–255, 293
- Updating, 8, 47, 58, 95, 106, 165, 246, 247, 249–251, 253, 256, 257, 260, 281, 311, 313, 320
- Usability, 43–61, 155, 227, 330, 350, 354, 356, 357, 359
- User-created content, 246, 270
- User-generated content, 2, 23, 125, 126, 161, 164, 178, 246, 362
- User interface, 74, 142, 206, 330, 350
- USGS. *See* United States Geological Survey (USGS)

**V**

- Value chain, 19, 20, 24–26
- Value, definitions
  - economic perspective, 16–20
  - philosophical perspective, 17
- Value, type
  - economic value, 18–20
  - qualitative value, 17–19
  - social value, 16, 20, 21
- Vancouver Island, 223
- Vector, 4, 207, 258, 330, 346
- Verifiable, 58, 107
- Verification of the Origins of Rotation in Tornadoes Experiment (VORTEX), 295, 296
- VGS. *See* Volunteered geographic services (VGS)
- Virtual Earth, 4, 330
- Virtual globe, 140, 143, 144, 343
- Virtual personas, 235
- Virtual spaces, 128, 135
- Visualization, 89, 99, 127, 128, 136, 140, 143, 148, 154, 161, 163, 194, 207, 208, 211, 369
- Volunteer, 21, 24, 31–40, 46, 55, 66, 91, 94, 112–114, 116, 117, 245, 250–251, 253, 255, 257, 267, 269, 295, 296, 317, 331, 367

**Volunteered geographic information (VGI)**

- heterogeneity, 22, 26, 27, 366
- quality, 362, 364–365
- value, 15–27

**Volunteered geographic services (VGS), 7, 8, 161–171****VORTEX. *See* Verification of the Origins of Rotation in Tornadoes Experiment (VORTEX)****VRML, 147, 154****W**

- WARNGEN, 303
- Water Hackathon, 10
- W3DS. *See* Web 3D Service (W3DS)
- Web 2.0, 2, 3, 7, 9, 16, 25, 26, 46, 65–67, 83–100, 125, 140, 161–164, 228, 233, 236, 246, 249, 266, 267, 277, 288, 300, 369
- Web crawling, 176
- Web demographics, 8, 265–282, 362
- Web 3D Service (W3DS), 143, 147, 148
- Weblog, 45, 50, 95, 97, 202, 206, 209, 211, 215, 216, 288
- Web-scraping, 266, 270
- Web 2.0 technologies, 100, 125, 277
- Wiki, 55–59, 126, 142, 175, 177, 180, 182, 183, 191, 194, 195, 344, 348, 366
- Wikification, 85, 178, 234
- Wikipedia, 3, 8, 55, 56, 113, 126, 163, 175–195, 202, 252, 257, 281, 364, 365
- Wikipedian, 177, 178, 183, 187, 189, 193, 194
- Wikipedia-World, 180, 184
- Wikiscanner, 178, 258
- Wikitext markup language, 179, 180, 183
- Wise crowds, 314
- Workflow, 52, 71, 181, 189, 246, 249–257
- WorldWind, 4

**X**

- XML. *See* eXtensible Markup Language (XML)
- XNavigator, 143, 144, 148

**Z**

- Zettabyete, 3
- ZIP Code, 271, 332, 333, 335
- Zipf's Law, 133–135, 177, 271