Thomas Morel

Professor of the History of Mathematics and its Teaching

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Education and Employment

2022 – present **Professor für Geschichte der Mathematik und ihres Unterrichts**
W2 Professur, Bergische Universität Wuppertal (NRW, Germany)
◇ 2025 Research stay at the Herzog August Bibliothek Wolfenbüttel

2015 – 2022 **Maître de conférences en histoire des mathématiques**
Laboratoire de Mathématiques de Lens (EA 2462) and University of Lille (France)
◇ 2020 Visiting scholar at the Max-Planck-Institute for the History of Science, Berlin

2013 – 2015 **Postdoctoral fellow**
Berlin Center for the History of Knowledge, Technical University of Berlin

2009 – 2013 **PhD in Epistemology and history of sciences**
Université de Bordeaux (France). Thesis title: *Mathématiques et politiques scientifiques en Saxe (1765-1851). Institutions, acteurs et enseignements*. Supervisors: Pascal Duris and Layla Raïd

Publications

Books

2022 *Underground Mathematics. Craft Culture and Knowledge Production in Early Modern Europe*, Cambridge, Cambridge University Press, 292 pages.

◇ Reviewed in the *American Historical Review*, *Nuncius*, *zbMath*, the *Journal for Design History*, the *Journal of History of Science and Technology* and by *The Renaissance Mathematicus*.

2015 *Von der akademischen zur praktischen Mathematik (1765–1851). Mathematisch-technische Bildung zwischen sächsischer Bergakademie und polytechnischer Schule Dresden*, Berlin, Diachron-Verlag, 353 pages.

◇ Reviewed in *Der Anschnitt* and in *Technikgeschichte*.

Edited Volumes

2022 Mathématiques professionnelles (XVI-XIX siècle), with Thomas Preveraud, special issue of the *Cahiers François Viète*, 2022 (see the volume introduction p. 5-22).

2016 *The Making of Useful Knowledge* (30-31 October 2014, with G. Parolini et C. Pastorino), *Preprint Series* of the Max-Planck-Institut für Wissenschaftsgeschichte, vol. 481, 91 pages.

Refereed Journal Articles and Book Chapters:

↪ *this is a selection of significant and recent publications, a comprehensive list is available here.*

forthcoming "Les publications périodiques comme miroir de l'évolution des mathématiques en langue allemande (1780-1830)", in Hélène Gispert, Philippe Nabonnand and Jeanne Peiffer, Cirmath (accepted, forthcoming).

2024 "Mathematics and Technological Change (1450-1686) : The Silent Rise of Practical Mathematics", in Jeanne Peiffer and Volker Remmert (eds.), *Bloomsbury Cultural History of Mathematics*, vol. 3, pp. 179-206

◇ „Ohne Maß/Zal und Gewicht/unmüglich ist Bergwerge zu erbauwen" Mathematik und Gerechtigkeit in den frühneuzeitlichen Bergpredigten", in *Der Anschnitt. Zeitschrift für Montangeschichte*, 76(4), S.130–146 forthcoming).

- "'All of this was born on paper': The Mathematics of Tunnelling in Eighteenth-Century Metallic Mines", in Christopher Hollings and Philip Beeley (eds.), *Beyond the Learned Academy: The Practice of Mathematics 1600–1850*, Oxford, Oxford University Press, pp. 314-337.

2022 "New Objects, Questions, and Methods in the History of Mathematics", with Jenny Boucard, in *Histories*, special issue *(New) Histories of Science, in and beyond Modern Europe*, vol. 2(3), pp. 341-351.

- "Incorporer, consolider et transmettre : Géométrie pratique et savoirs miniers à l'époque moderne", in *Les ingénieurs, des intermédiaires ?*, Toulouse, Presses Universitaires du Midi, pp. 173-186.

2021 " Enseigner les mathématiques dans une région minière: prégnance du contexte local dans les Monts Métallifères de Saxe", in Renaud d'Enfert and Virginie Fonteneau (dir.), pp. 81-101.

2020 " De Re Geometrica: Writing, Drawing and Preaching Mathematics in Early Modern Mines", in *Isis, A Journal of the History of Science Society*, 111(1), pp. 22-45.

- "Markscheidekunst und die Anwendung der Mathematik im frühneuzeitlichen Bergbau", in Rainer Gebhardt (ed.), Die Entwicklung der Mathematik in der frühen Neuzeit, 2020, pp. 301-312.

2018 "Five Lives of a *Geometria subterranea* (1708-1785). Authorship and Knowledge Circulation in Practical Mathematics", in *Revue d'histoire des mathématiques*, 24(2), pp. 207-258.

- "Julius Weisbach's Pioneering Contribution to Orthogonal Linear Regression (1840)", with D. Stoyan, in *Historia Mathematica*, 45(1), 2018, pp. 75-84.

- "Was ist praktisch am mathematischen Wissen? Die Positionen des Bergmeisters J. A. Scheidhauer und des Baumeisters C. F. Steiner in der Zeit um 1800", with K. Klinger, in *NTM Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin* 26, pp. 267-299.

2017 "Bringing Euclid into the Mines: Classical Sources and Vernacular Knowledge in the Development of Subterranean Geometry", in *Translation and the Circulation of Knowledge in Early Modern Science*, Fransen S., Hodson N. and Enenkel K. (éds.), Brill, pp. 154-181.

2015 "Le microcosme de la géométrie souterraine : échanges et transmissions en mathématiques pratiques", in *Philosophia Scientiæ*, special issue *échanges mathématiques : études de cas (XVIIIe-XXe siècles)* 19/2, pp. 17-36.

- "Une révolution peut en cacher d'autres. Le paysage morcelé des mathématiques dans l'espace germanophone et ses reconfigurations", with M. Bullynck, in *Sciences mathématiques 1750-1850 : continuités et ruptures*, C. Gilain and A. Guilbaud (éds.), CNRS Editions, pp. 181-206.

2014 "Arithmetical Periodicals in late Eighteenth-Century Germany: 'Mathematics for the Use and the Pleasure of Civic Life'", in *Archives Internationales d'Histoire des Sciences*, 64-172/173, pp. 397-427.

2013 "Mathématique et *Naturphilosophie* : L'exemple de la controverse entre J.J. Wagner et J. Schön (1803-1804)", in *Revue d'Histoire des Sciences*, 66(1), pp. 73-105.

Conferences proceedings and textbooks chapters:

2023 "Johann Berger, Abraham von Schönberg und die Freiberga Subterranea", in Montanhistorisches Kolloquium (MHK) 2023, pp. 65-88.

2019 "Subterranean geometry and its instruments: About practical geometry in the Early Modern Period", in *Oberwolfach Reports* 58, MFO, pp. 80-83.

2016 "The Making of Useful Knowledge" (Conference held in October 2014), T. Morel, G. Parolini and C. Pastorino (editors), in the *Preprint Series* of the Max-Planck-Institut für Wissenschaftsgeschichte MPIWG, vol. 481, 91 pages.

- "Usefulness and Practicability of Mathematics: the German Mining Academies in the 18th century", in *The Making of Useful Knowledge*, Max-Planck-Institut für Wissenschaftsgeschichte, *Preprint Series* vol. 481, pp. 49-63.

Popularization:

2023 Interview on The Thinker's Garden (March 19).

- Blog post for the *History of Knowledge* blog of the German Historical Institute: "Why Should You Trust Geometry?" (August).

2021 "La géométrie des mines à la Renaissance : Discours et pratiques", in *L'Esprit d'Archimède*, vol. 5, 2021, pp. 11-13.

2018 "Une nouvelle forme de propriété", with H. Morel, in *Alternatives économiques* (février 2018, p. 61, extended version available online).

2016 "Une des plus belles applications de la géométrie' : les manuscrits de géométrie souterraine au XVIIe siècle", in *Images des mathématiques*, CNRS (15.09.2016).

2015 "Ce que la réunification allemande nous enseigne sur la crise grecque actuelle", in *AlterEcoPlus* (17.07.2015).

2013 "Les Trente Immortelles de Genève et la dette du royaume de France", in *Alternatives économiques* (septembre 2013, pp. 79-80).

- "Vive la Banqueroute, comment la France a réglé ses dettes de Philippe Le Bel à Raymond Poincaré", Thomas Morel and François Ruffin (dir.), Fakir éditions, 128 p.

Translations:

2024 "Wie liest man historische mathematische Texte?", translation of B. Wardhaugh *How to Read Historical Mathematics?* (English → German), Springer.

2023 "Mathématiques pratiques et éloquence latine", translation of Alisz Reed and Deborah Kent (English → French, with Dr. T. Préveraud) for *Images des mathématiques*, CNRS (11.09.2023).

2021 "Le thème de la triste et laide Kovalevskaya", translation of E. Kaufholz-Soldat (German → French) for *Images des mathématiques*, CNRS (28.09.2021).

2019 "Analyse des imageries des instruments scientifiques de l'époque moderne (XVIe-XVIIe siècle), translation of V. Remmert (German → French) for *Images des mathématiques*, CNRS (29.05.2019).

2013 "Mr. Strawson sur la théorie logique", translation (English → French, with Prof. Dr. L. Raïd) of W.O. Quine, in *Les voies du paradoxe* Paris, Vrin, pp. 249-279.

Book reviews:

2022 *Technoscience in History. Prussia, 1750-1850*, Ursula Klein (Cambridge, The MIT Press, 2020), in *Centaurus*, 64(1), p. 297-300.

2020 *Sailing School. Navigating Science and Skill, 1550-1800*, Margaret Schotte (Baltimore, John Hopkins University Press, 2019), in *Revue d'histoire des sciences*, 73(2), pp. 384-386.

2018 *Mobilités d'ingénieurs en Europe, XVe-XVIIIe siècle*, Stéphane Blond, Liliane Hilaire-Pérez and Michèle Virol (dir.) (Rennes : PUR, 2017), in *Artefact*, 8, pp. 355-358.

- *Mathematical Practitioners and the Transformation of Natural Knowledge in Early Modern Europe*, Lesley B. Cormack, Steven A. Walton, John A. Schuster (eds), Studies in History and Philosophy of Science 45 (Wiesbaden : Springer, 2017), in *Revue d'histoire des sciences*, 71(1), pp. 114-116.
- *Les chaires et l'esprit. Organisation et transmission des savoirs au sein d'une université germanique au XVIIe siècle*, Boris Klein (Lyon, Presses Universitaires de Lyon, 2017), in *Revue d'histoire des sciences*, 71(1), pp. 123-124.

2014 *Mathematik im Prozess : Philosophische, Historische und Didaktische Perspektiven*, M. Rathgeb, M. Helmerich, R. Krömer, K. Lengnink and G. Nickel (éds.) (Wiesbaden : Springer, 2013), in *Essais : Revue interdisciplinaire d'Humanités*, 4, pp. 185-188.

2013 *The Disordered Police State, German Cameralism as Science and Practice*, Andre Wakefield (Chicago : University Press, 2009), *in Revue d'histoire des sciences*, 66(1), pp. 224-226.

Work in progress:

- Translation and commentary of the "New book on subterranean geometry" (*Neu Markscheide-Buch*) by Adam Schneider (c. 1669).

Scientific presentations and Conferences

↪ for a complete list, see `http://morelthomas.com/communications/`

2025 "'Die mathematische Lehrart ohne das äusserliche Kleid': Zum Alltagsleben einer akademischen Disziplin im 18. Jahrhundert", Toeplitz Kolloquium, Bonn, Januar 11.

2024 "Usages et publics des Eléments d'Euclide dans l'espace germanique au XVIIIème siècle", conférence Euclid in the Modern Age, Paris, November 24.

- "Patrimoine et autorité en mathématiques pratiques: le cas de la géométrie souterraine", séminaire Patrimath, October 25, Paris, IHP.
- "Cultures of Accuracy in Early Modern Mathematics: Precision, Approximation and Correctness", panel at the ESHS Meeting, Barcelona, September 7.
- "Pratiques de la quantification et statut des mathématiques à l'époque moderne", Université de Nancy, 17 May.
- ""Es kan niemand durch den Stein sehen": Trust, Expertise and the Underground in the Early Modern Period", Medieval Undergrounds symposium, University of **Toronto**, 5-7 May.
- "Mathematics for the "Common Man": Practitioners, Teachers and the Early Modern Mathematical Life", Meeting 'New directions in History of Mathematics: Research and Teaching', Open University **Milton Keynes**, 25 April.
- "Practical Arithmetic between Theory and Practices (15th-16th cent.)", Normative Texts and Occupational Practices, ETH **Zurich**, 9-10 February.
- "Que nous disent les encyclopédies hors-normes sur les usages des mathématiques de leur époque ?", Patrimoine et patrimonialisation des mathématiques (XVIIIe-XXe siècle), CIRM, **Marseille**, 8-12 January.

2023 "The Future of History of Science and Technology: A French Perspective", during the DHST Global History of Science and Technology Festival 2023, session 15 / **online**, September 29 (see video here)

- ""A Matter of Experimental & Workmanly Mathematics". Quantifying, Measuring and Writing in Mining Craft", Joint Masterclass Program, Artisanal Modes of Writing, Drawing, and Modeling, 1400-1830, Columbia University, **New York**, September 29.
- "The Circulation of Practical Mathematics: Examples from the Holy Roman Empire", 10th annual meeting of Scientiae, **Prag**, June 7.
- "An die Mathematik glauben: Geometrie und die Bergpredigten in der frühen Neuzeit" Oberseminar Frühe Neuzeit, Universität **Gießen**, June 5.
- "Les Manuels Roret et la patrimonialisation des mathématiques (1822–1939)", Seminar of the ANR-project Patrimaths, **Paris**, March 6.
- Antrittsvorlesung, Mathematisches Kolloquium, Bergische Universität **Wuppertal** (Germany), January 10th.

2022 "Underground Mathematics. Handwerkskultur und Wissensproduktion im frühneuzeitlichen Europa", IZWT-Kolloquium, Bergische Universität **Wuppertal** (Germany), October 19th.

- "The Mathematical Education of Practitioners and Its Sources (16th-19th century)", 7th International Conference on the History of Mathematics Education (ICHME), **Mainz** (Germany), September 19-23th.
- "Artisanal Practices and Mathematics between the Ore Mountains and the Court of Dresden", 10th Conference of the European Society for the History of Science, in the session *Scholarly and artisanal mathematics in the Early Modern Period*, **Brussels** (Belgium), September 7-10th.

- "*'So Fair a Subterraneous City'*: Mining, Maps, and the Politics of Geometry in the Seventeenth Century ", History of Mathematics Seminar, **Oxford** University, June 9th.
- "*"Es mathematisch wieder zu erfinden': Wissenschaft, Innovation und Bergbau im sp□ten 18ten Jh.",RheWeSe, Seminar zur Geschichte und Philosophie der Mathematik, Hagen, June 3rd.*
- "The Mines and the Court: Artisanal Practices and Mathematics in Early Modern Dresden", Princeton-Bucharest Seminar in Early Modern Philosophy, online, May 10th.

2021 "Géométrie, géographie et cartographie à l'époque moderne", Journée d'études L'histoire des sciences aujourd'hui, **Bordeaux**, November 17th

- " 'Eine der schönsten Anwendungen der Geometrie': Die Berechnung des Tiefer-Georg Stollens (1771-1799)", Landeshistorisches Kolloquium, Universität **Göttingen**, November 10th.
- "Prêcher la géométrie : les sermons miniers de Johannes Mathesius et Cyriacus Spangenberg", séminaire d'histoire des mathématiques de **Lille**, March 11th.
- "Écrire, dessiner et prêcher des pratiques mathématiques dans les mines de l'époque moderne", séminaire " Histoire des sources, histoire du texte", laboratoire SPHERE, Université **Paris**-Diderot, January 14th.

2020 "One of Geometry's Nicest Application": Digging the Georg-Tiefer Stollen (1771-1799), Max-Planck Institut für Wissenschaftsgeschichte, Department III Colloquium, **Berlin**, June 2nd.

2019 "The Silent Rise of Practical Mathematics (1450-1686)", IZWT, Bergische Universität Wuppertal, 11 décembre.

- "Unterirdische Mathematik. Zur Darstellbarkeit der Vermessung von Gruben und Stollen in der Frühen Neuzeit", IZWT, Bergische Universität **Wuppertal**, 11 décembre.
- "Writing, Drawing, and Preaching Geometry in the Early Modern German Mines", 2019 meeting of the History of Science Society, session "Practical Mathematics in Early Modern Europe", organized by myself, **Utrecht**, July 23-27.
- "Résoudre par l'arithmétique ou par la géométrie : sur l'utilisation des cartes en géométrie souterraine (XVIIIe siècle)", séminaire "Approches historiques, philosophiques et anthropologiques des nombres, de la mesure et de la mesurabilité", laboratoire SPHERE, **Paris** 7, June 14th.
- "Mathematik in Bergwerken der frühen Neuzeit: Wer, wie und warum?", Ringvorlesung zur Geschichte der Mathematik, Studium Generale, TU Bergakademie **Freiberg**, February 4th.

2017 "Subterranean geometry and its instruments: about practical geometry in the Early Modern Period", meeting *Mathematical Instruments between Material Artifacts and Ideal Machines: their Scientific and Social Role before 1950*, Mathematisches Institut **Oberwolfach**, December 17-23.

- "The Geometria subterranea manuscripts (1600-1750): Knowledge transmission in a practical context", in the Symposium S 093 (Specificities of scientific or scholarly documents as a reflection of curricula) if the 25th International Congress for the History of Science, Technology and Medicine (iCHSTM), **Rio de Janeiro**, July 24th.
- "Practical Geometry in early modern Germany: Miners and Scholars, Instruments and Theories", seminar "Early Modern Mathematical Instruments And Their Users", organized by Antoni Malet and Elena Ausejo, Universitat Pompeu Fabra, **Barcelone**, March 23-24.

2016 "Circulating mining knowledge from Freiberg to Almaden: The life and career of J.M.Hoppensack (1741-1815)", colloquium *Sciences, savoirs et politique : Alexander von Humboldt et Aimé Bonpland entre Europe et Amérique Latine*, session organized by Jacob Vogel, **Paris**, SciencesPo / IHEAL, July 6th.

- "Subterranean geometry and its measurement units (16th-18th centuries)", séminaire d'histoire et philosophie du laboratoire SPHERE (SAW), 'Measurement units in the history of mathematics and beyond', **Paris**, April 4th.

2015 "J.A. Scheidhauer und die Markscheidekunst: Beispiel einer Mathematisierung für die Praxis am Ende des 18. Jahrhunderts", annual meeting of the DGGMNT (German Society for the History of Science), Technische Universität, **Berlin**, September 25-27.

- "Underground Mathematics: Manuscripts and Knowledge Circulation in the German Mining States", 61st Annual Meeting of the Renaissance Society of America, session *The Material Culture of the Mines in Early Modern Europe* organisée par Tina Asmussen and Henrike Haug, **Berlin**, March 26-28.

2014 "Usefulness and practicability of Mathematics: German Mining Academies in the 18th century", workshop The Making of Useful Knowledge, MPIWG, **Berlin**, October 30-31.

- "Schoolteaching in the *Bergstaat*: mathematics in the Ore Mountains of Saxony (1750-1850)", 6th International Conference of the ESHS, in the session *Local supply of scientific and technical education*, Portugal, **Lisbon**, September 4-6.

2013 "Mathematics in the Mines: a Biographical Sketch of the *Markscheider* J.A. Scheidhauer (1722-1784)", during the 24th Novembertagung on the History of Mathematics, De Morgan House, **London**, November 20-22.

- "Mathematics in polytechnic schools in the German-speaking area", in the Symposium S 011 of the 24th International Congress for the History of Science, Technology and Medicine (iCHSTM), **Manchester**, July 22-28.
- "Institutional context of German mathematics at the time of publication of Lambert's *Theorie der Parallellinien*", workshop *Johann Heinrich Lambert : Science and Epistemology*, organized by Vincenzo De Risi at the Max-Planck Institut für Wissenschaftsgeschichte (MPIWG), **Berlin**, April 25th.

Scientific Service

2022 – present Member of the Graduiertenkolleg 2696 *Transformationen von Wissenschaft und Technik seit 1800: Inhalte, Prozesse, Institutionen*, Bergische Universität Wuppertal.

Supervision Co-advisor (*Zweitbetreuer*) of the PhD thesis of Jan Nicolay, "Welchen Einfluss hatten Forschungsschiffe auf die innere und äußere Entwicklung der Ozeanographie in Deutschland am Beispiel der Meteor I bis III?", 2022—2025.

University Service

2024 Search committes (*Berufungskommission*) W2-Professur Didaktik der Mathematik mit dem Schwerpunkt Grundschule, Bergische Universität Wuppertal.

Administration Service

2016 – present *Société française d'histoire des sciences et des techniques* (SFHST):

- From 2016 to 2020, in charge of the website and communication `https://sfhst.hypotheses.org/`
- From 2020 to present, **president** of the society. Co-organization of the Bordeaux 2023 *Congrès*.

2020 – 2023 Member of the GDR Histoire des mathématiques. Member of the scientific committee for the 2023 Summer school at the CIRM, Marseille.

- **Book review editor** (English language) for *Historia Mathematica*.
- Member of the **editorial board** of *Centaurus*, the official journal of the European Society for the History of Science (and part of the mentoring programm), of the *Cahiers François Viète* (and responsible for volume III.16), of the column *Histoire des mathématiques* for the website *Images des maths*.

Reviewer for the following **journals**:
Artefact, *Centaurus*, *E-Phaistos*, *Isis*, *Mathematical Reviews*, *Philosophia Scientiæ*, *Perspective on Science*, *Revue d'histoire des mathématiques*, *Science in Context*, *Siegener Beiträge zur Geschichte und Philosophie der Mathematik*, *Technikgeschichte*, *ZDM - Mathematics Education*.

- for the following **editors** or **book series**:
Routledge, *Springer* (International Archives of the History of Ideas),

Evaluation for the following **institutions**:
Leibniz-Institut für Europäische Geschichte (IEG Forschungsstipendium)
European Research Council (ERC Consolidator Grant) .

Membership Member of the SFHST *Société française d'histoire des sciences et des techniques* and of the GWMT *Gesellschaft für die Geschichte der Wissenschaften, der Medizin und der Technik*.

Popularization

2020 Participation to the documentary "Die Wege des Kupfers II", produced by Stanislav Manca.

2013 Participation to the documentary "Lagrange", produced by the Institut Henri Poincaré (Paris) under the scientific direction of Frédéric Brechenmacher, 2013, `http://images.math.cnrs.fr/Lagrange-un-documentaire-exclusif.html`.

2011 – 2012 Member of the scientific council for the exhibition "Mathissime" organised by the museum Cap Sciences (Bordeaux), 2011-2012.

Awards, Honors and Grants

2025 Visiting scholarship of the Herzog August Bibliothek, Wolfenbüttel, Summer 2025.

2020 Visiting scholarship of the MPIWG in the *Art of Judgment*, Berlin, April - Juli.

2018 *Grattan-Guinness Archival Travel Grant* for a book project on the history of subterranean geometry.

- DAAD (*Deutscher Akademischer Austauschdienst*) research grant for a two-months archive stay in Germany (July-August 2018).

2015 *Professor Ludwig Weickmann Foundation Prize*, Universität Leipzig for the dissertation "*Mathématiques et politiques scientifiques en Saxe (1765-1851). Institutions, acteurs et enseignements*".

2014 Dissertation Prize, Université de Bordeaux (IdEx), category "Sciences Humaines et Sociales" (SHS), for the dissertation "*Mathématiques et politiques scientifiques en Saxe (1765-1851). Institutions, acteurs et enseignements*".

- Travel grant from the Fritz Thyssen foundation for a research stay at the Slovaquian National Archive (Banskà Stiavnica, July).
- Travel grant from the DAAD (*Deutscher Akademischer Austauschdienst*) to attend the International Conference of the European Society for the History of Science, Lisbon, September.

2013-2016 Research grant attributed by the *Berlin Center for the History of Knowledge* (MPI, HU, TU and FU Berlin), to work as an invited researcher at the Technical University Berlin.

- Travel grant for young researchers, attributed by the *Comité National Français d'Histoire et de Philosophie des Sciences* (CNFHPS) to attend the International Congress of History of Science, Technology and Medicine in Manchester, 2013.

2010 Research Grant from the Institut Français d'Histoire en Allemagne (IHFA), for a two-month internship at the MPIWG.

- Award "*Découverte Science*" de l'Académie Nationale des Sciences, Belles-Lettres et Arts de Bordeaux, for the Master's degree work : "*Georg Cantor et la théorie des ensembles : origine, développement et postérité d'une théorie spéculative*".