

Euclid in the vernacular. Cross-cultural transmissions, adaptations and transformations of Euclid's Elements in early modern Europe

Thursday and Friday September 10-11, 2026

Bergische Universität Wuppertal / IZWT
Glanzstoffhaus, Kasinostraße 19-21, 42103 Wuppertal

Organizers: Angela Axworthy and Volker Remmert

Funded by the DFG in the framework of the ANR-DFG project *EUCLIDES. Euclid in the Modern Age. A History of Cross-Cultural Transmissions, Translations and Transformations of the Elements* (Project number 530000455)

This workshop investigates the circulation and transformation of Euclid's *Elements* in vernacular languages in early modern Europe. It focuses on how the translation of the *Elements* from Greek, Latin, Arabic, and other vernacular languages affected its textual and visual content, logical and editorial structure, and modes of exposition and elucidation, as well as on the linguistic and cultural specificities that shaped these processes of adaptation. Particular attention will be given to the social, cultural, professional, and institutional backgrounds of vernacular translators, their motivations and intended audiences, and the contexts in which vernacular editions acquired particular prominence and uses. The workshop will also consider the circulation of Euclidean principles and propositions through partial translations embedded in elementary geometry courses, introductions to mathematics, practical geometry treatises, and artisans' handbooks. By examining the progressive expansion of the vernacular Euclid across different linguistic, educational, and professional contexts, the workshop aims to contribute to a better understanding of the role of translation in the transmission of geometrical knowledge, the changing readerships and uses of the *Elements*, and the development of mathematical literacy in early modern Europe.



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WORKSHOP PROGRAMME

Thursday 10.9

- 13:30-14:00 *Welcome and introduction*
- 14:00-15:00 Benjamin WARDHAUGH (University of Oxford), *Vernacularising the mos geometricus, c. 1550–1700*
- 15:00-15:45 Veronica GAVAGNA (Università degli Studi di Firenze), *The Traduttore's comments: A guide to reading Tartaglia's vernacular Elements (online)*
- 15:45-16:00 *Coffee break*
- 16:00-16:45 Sabine ROMMEVAUX (CNRS-Ausonius / Université Bordeaux Montaigne), *Book X of Euclid's Elements in the 17th-century French translations by Didier Dounot, Denis Henrion, Pierre Le Mardelé, and Jacques-Alexandre Le Tenneur (online)*
- 16:45-17:30 Angela AXWORTHY (Bergische Universität Wuppertal / IZWT), *Euclid's Elements in German in the sixteenth and seventeenth centuries*
- 17:30-17:45 *Coffee break*
- 17:45-18:30 Frédéric LAURENT (Université Clermont-Auvergne), *Euclid's Elements in Armenian: Terminological stakes and cultural motivations of a little-known transmission (online)*

Friday 11.9

- 9:00-9:30 *Coffee*
- 9:30-10:15 Niccolò GALIZIOLI (Ruhr-Universität Bochum), *Translating Euclid into the vernacular: Definitions V.5 and V.7 between Niccolò Tartaglia, Angelo Caiani, and Federico Commandino (online)*
- 10:15-11:00 Juan NAVARRO-LOIDI (University of the Basque Country – EHU), *Printed versions of Euclid's Elements in Spanish*
- 11:00-11:30 *Coffee break*
- 11:30-12:15 Peter-Maximilian SCHMIDT (CNRS-SPHère – Université Paris-Cité), *The Lusophone Euclid - A mandate of the state?*
- 12:15-14:00 *Lunch*
- 14:00-14:45 Danny BECKERS (Vrije Universiteit Amsterdam), *Dutch editions of the Elements in seventeenth- and eighteenth-century teaching of Euclid*
- 14:45-15:30 Thomas MOREL (Bergische Universität Wuppertal / IZWT), *The Elements of Johann Friedrich Lorenz (1738–1807)*
- 15:30-16:00 *Coffee break*

- 16:00-16:45 Andrei RODIN (CNRS-SPHère – Université Paris-Cité), *Russian translation of Euclid's Elements by Suvorov and Nikitin (1784) and the teaching of elementary geometry in Imperial Russia*
- 16:45-17:30 Ciarán MAC AN BHAIRD and Siobhán NIC FHEARAIGH (Maynooth University), *Euclid in Ireland: Circulation, use and reception, and the late emergence of Gaelic vernacular translations*
- 17:30-18:00 *General discussion and conclusion*

ABSTRACTS

Benjamin WARDHAUGH (University of Oxford) – *Key-Note Lecture*
Vernacularising the mos geometricus, c. 1550–1700

Building on my recent papers on the Euclidean vocabulary in European vernaculars and in Latin, and my work cataloguing early modern editions of ancient mathematical texts, I will survey the choices made by translators in the early modern period with respect to the logical and structural vocabulary of geometrical works, and also with respect to the grammatical form of propositions and proofs. I will attempt to understand what it meant to produce a vernacular equivalent of the *mos geometricus*, and what resources were available – and were used – in order to do so.

Veronica GAVAGNA (Università degli Studi di Firenze)

The Traduttore's comments: A guide to reading Tartaglia's vernacular Elements (online)

In 1543, Niccolò Tartaglia published a translation of Euclid's *Elements* into vernacular Italian. His linguistic choices were partly due to his sources belonging to different textual traditions: Campano da Novara's Arabic-Latin recensio and Bartolomeo Zamberti's Greek-Latin humanistic edition. Another factor that profoundly influenced Tartaglia's linguistic choices was the intended audience of the translation: practitioners who could finally access the geometry of "mathematicians". Tartaglia's attention to his intended readers is evident in the comments in italics in the printed edition (entitled "Traduttore"). These comments contain methodological instructions, philosophical and linguistic reflections, and useful observations for inexperienced readers. These comments serve as a guide to reading the *Elements*, clarifying Euclid's subtleties and obscure phrases ("le sottilità e le oscure sententie di Euclide"). However, analyzing the translator's comments requires also comparing them with Parts Three, Four, and Five of the *General Trattato*, where the comments on the Euclidean edition are often repeated and expanded "for those who have not seen Euclid" ("per quelli che non hanno visto Euclide") and placed entirely in the world of practical geometry. This contribution focuses on the definitions and propositions of Book I of the 1543 edition, exploring their relationship with the corresponding passages of the *General Trattato* to highlight similarities and differences.

Sabine ROMMEVAUX (CNRS-Ausonius / Université Bordeaux Montaigne)

Book X of Euclid's Elements in the 17th-century French translations by Didier Dounot, Denis Henrion, Pierre Le Mardelé, and Jacques-Alexandre Le Tenneur (online)

The first French editions of Euclid's *Elements*, published in the 16th century, included only Books I to VI, covering plane geometry and the theory of proportions, as well as Books VII to IX, which focus on arithmetic. It was not until the 17th century that the first complete French translations of the *Elements* appeared, based on a Latin version by Didier Dounot in 1609 and another by Denis Henrion in 1614, and based on a Greek version by Pierre Le Mardelé in 1622. We add to this list the French translation of Book X alone (the focus of our study), based on a Latin version by Jacques-Alexandre Le Tenneur in 1640.

Book X, which presents a classification of irrational lines, is considered one of the most challenging books, particularly due to the highly specialised vocabulary Euclid employs to describe the various lines. We shall examine how these authors translated, interpreted, and understood this book.

Angela AXWORTHY (Bergische Universität Wuppertal / IZWT)

Euclid's Elements in German in the sixteenth and seventeenth centuries

With Johann Scheubel's adaptation of Euclid's *Elements* (Books VII-IX) in 1555 in Augsburg and Wilhelm Xylander (Hotzman)'s translation and commentary of Books I-VI in 1562, German was the second vernacular language in which Euclid's canonic sum of geometry and arithmetic was translated in early modern Europe, after Niccolò Tartaglia and Angelo Caiani's Italian translations in 1543 and 1545, respectively. These works were followed in the seventeenth century by the German translations and commentaries by Simon Marius (1610), Lucas Brunn (1625), Meißner

(1690), Pirckenstein (1694) and Reyher (1697). This paper will examine the motivations and approaches adopted by the authors of these editions for the transmission of Euclid in German.

Frédéric LAURENT (Université Clermont-Auvergne)

Euclid's Elements in Armenian: Terminological stakes and cultural motivations of a little-known transmission (online)

This paper explores the Armenian translation of Euclid's *Elements*, currently preserved as a fragment of Book I within several manuscripts across Armenia and Western Europe. This text represents, until now, the earliest known vernacular rendering of Euclid in Armenian, predating the more extensive translations undertaken during the 17th and 18th centuries.

The study begins with a descriptive and comparative analysis of the extant manuscripts, examining their features and identifying scribal errors, as well as textual or graphic flaws, in order to assess the significance of the Armenian version.

Based on scholarly debates that spanned from the late 19th century to the 1980s, the article discusses the hypotheses regarding the translation's authorship and its historical context. Finally, it analyses the "act of translation" itself, uncovering how specific terminological and phraseological choices reveal both the linguistic challenges of expressing geometrical thought and some characteristics of the Armenian language.

Niccolò GALIZIOLI (Ruhr-Universität Bochum)

Translating Euclid into the vernacular: Definitions V.5 and V.7 between Niccolò Tartaglia, Angelo Caiani, and Federico Commandino (online)

The oldest translation of Euclid published in Italian is that of Niccolò Tartaglia, published in 1543 and subsequently reprinted several times. My contribution aims to examine Tartaglia's translation into vernacular Italian of some definitions from Book V of Euclid's *Elements*, in particular the fifth and seventh, comparing them with a little-known translation from the same period (1545) into Tuscan by Angelo Caiani, the only complete Italian translation of Euclid's work from that period until the late seventeenth century, and with the famous translation from Greek to Latin by Federico Commandino (1575). The analysis focuses on the translation strategies adopted by the three authors, with particular attention to the rendering of the technical lexicon of proportions (ratio, magnitudes, equimultiples) and to the transposition of the demonstrative and definitional structure of the Euclidean text. Through a detailed comparison of the formulations, this paper aims to highlight the different balance between faithfulness to the Greek and the need for vernacularization, demonstrating how Tartaglia's translation oscillates between mathematical precision and didactic purposes, while Caiani's presents more markedly paraphrastic and interpretative traits, and Commandino's stands as a model of philological rigor. From this perspective, the paper aims to highlight how Eudoxus's theory of proportions—the theoretical core of Book V—was received, adapted, or at times simplified in the transition from Greek to Latin and the vernacular, helping to clarify the processes of transmission and transformation of mathematical knowledge in the European Renaissance.

Juan NAVARRO-LOIDI (University of the Basque Country – EHU)

Printed versions of Euclid's Elements in Spanish

There were, at least, seventeen different versions of Euclid's *Elements* in Spanish before nineteenth century: Zamorano (1576), Stafford (1634), Carduchi (1637), San Nicolas (1665), Zaragoza (1671), Puig (1672), Fernández de Medrano (1688), Kresa (1689), Escuela de Palas (1693), Larrando de Mauleón (1698), Ulloa (1706), Tosca (1707), Deu y Abella (1723), Alvarez (1739), Martinez de Velasco (1747), Simson (1774) and Giannini (1779). None of them has all of Euclid's thirteen books. Usually they count the six first books on plane geometry, and often also the eleventh and twelfth on solid geometry; the arithmetical books were rarely included.

Zamorano's first translation follows Euclid faithfully and proudly. Following versions had a didactic aim, and pedagogy was privileged over accuracy of the translation or mathematical rigour.

At the end of the eighteenth century Spanish versions of the *Elements* became more faithful, seeking to provide a more rigorous geometry. But, at the same time, the suitability of the *Elements* as a textbook became debated.

Spanish translations of Euclid's *Elements* were written mostly for Jesuit colleges, or for military academies; few were intended for general use. The authors were generally members of a religious order, principally Jesuits, or professors of a military establishment.

These versions of the *Elements* inform us about Spanish mathematics, for instance, about the acceptance of parallel postulate, the status of mixtilineal angles, or on the interpretations of the theory of proportions. In several versions from seventeenth century onwards, exhaustion is replaced by Tacquet's theory of degenerating figures, a precursor of infinitesimal calculus. They also show the influence of Clavius, Tacquet and other French or Italian mathematicians in Spanish mathematics.

Peter-Maximilian SCHMIDT (CNRS-SPHère – Université Paris-Cité)

The Lusophone Euclid - A mandate of the state?

During the early 18th century, the Portuguese state invested heavily in the education of his military engineers, which was accompanied by a rising importance of geometrical teaching both in Brazil and Portugal. In 1735, Manoel De Campos published the first printed Portuguese version of the *Elements*, followed roughly 30 years later by Angelo Brunelli's own lasting translation. Despite their closeness in time and space, these editions are worlds apart. However, both of them bear the marks of strong socio-political pressures. In my talk, I wish to contextualize these two editions, paying particular attention to the role of the state in their genesis. Furthermore, it will become clear that they must be understood as links within a chain of both published works and circulated manuscripts. Their conjunction will testament to a fundamental rupture that marked mathematical education in the Portuguese empire.

Danny BECKERS (Vrije Universiteit Amsterdam)

Dutch editions of the Elements in seventeenth- and eighteenth-century teaching of Euclid

In the midst of the rebellion against Spain, the Dutch "prince of Orange" (the ancestral lands of Nassau Siegen had already been taken from him) gave the Dutch university of Leyden the task of organising mathematics courses in the vernacular. His idea was to have enough surveyors trained to aid in the building of fortresses and making accurate maps. Also at other universities mathematicians were hired to teach practical geometry in the vernacular.

It is against this background that the first Dutch translation of *The Elements* of Euclid was published by Jan Dou, in 1606. Dou himself wasn't capable of studying original Latin, Greek or Arabic sources. He had used the German translation by Wilhelm Holtzman and the French edition by Errard de Bar-le-Duc, which were widely available (and read) in The Netherlands. The book knew several prints, and various other translations would follow, some of them used at the university courses in the vernacular.

The Dutch translations focus on books I-VI (with a few notable exceptions), and all of them make changes in the structure of the books. Looking at some of the manuscripts produced by students in the 17th and 18th centuries on the basis of the lessons from these books, it seems that the structure of *The Elements* was hardly what was appreciated - although all the authors pride themselves for the novelties in the structural changes. Some of the manuscripts skip theorems and even entire books of *The Elements*, to focus on tricks for drawing maps, design of fortresses and other constructions.

Thomas MOREL (Bergische Universität Wuppertal / IZWT)

The Elements of Johann Friedrich Lorenz (1738–1807)

Johann Friedrich Lorenz's translation of Euclid's *Elements* (1781-1840) achieved lasting popularity in the German-speaking world. Lorenz, however, was neither a classicist nor a typical professor of mathematics; he was a theology student and teacher at the Pädagogium in Kloster

Berge. A prolific author of textbooks in mathematics and natural sciences, Lorenz published several series of *Elemente* and *Grundrisse* at the turn of the nineteenth century. Comparing his own *Elemente* with his translation of Euclid's *Elements*, we will see the deep influence of the Greek model on his modern teaching method, as well as the adaptations to rapidly the modernizing school and university systems.

Andrei RODIN (CNRS-SPHère – Université Paris-Cité)

Russian translation of Euclid's Elements by Suvorov and Nikitin (1784) and the teaching of elementary geometry in Imperial Russia

Most geometry textbooks produced in Russian in the early days of the Russian Empire (from 1721 onward) were practice-oriented. By and large, they followed the teaching model described by Jean Le Rond d'Alembert in his and Denis Diderot's *Encyclopédie* (see vol. 7, 1757), as well as contemporary examples such as Alexis Clairaut's *Éléments de géométrie* (1741). In France, the new wave of mathematics textbooks composed according to this model competed with more traditional Euclid-style textbooks. In early eighteenth-century Russia, however, the d'Alembert-style, practice-oriented approach to teaching geometry was immediately accepted as the default model—first, because it arguably best served the military and commercial needs of the time, and second, because Russia at that point lacked an established tradition of mathematics education.

Nevertheless, by the mid-eighteenth century the Euclidean axiomatic model of teaching geometry found defenders and proponents in Russia, some of whom emphasised the importance of logical rigour, while others were motivated by historical interest. The Euclidean tradition in Russia became firmly established with the appearance in 1784 of translation of 8 books of the *Elements* by two Saint-Petersburg's Cadet Corps officers and professors, both Oxford graduates, Prokhor Suvorov and Vassily Nikitin, which was the first Russian translation of Euclid made directly from Greek. In my talk I shall focus on Suvorov & Nikitin's Euclid and discuss its role in the development of Russian mathematical terminology.

Ciarán MAC AN BHAIRD and Siobhán NIC FHEARAIGH (Maynooth University)

Euclid in Ireland: Circulation, use and reception, and the late emergence of Gaelic vernacular translations

This paper explores the history of Euclid's *Elements* in Ireland, a work that circulated widely from the early modern period but left little trace in the Irish language (Gaeilge) until the nineteenth century. We begin by examining why Ireland diverged from the broader European pattern in which vernacular translations of Euclid appeared relatively early. Drawing on evidence from institutional and private collections, we analyse the circulation and use of Euclid in Ireland from the early sixteenth century onward. These collections include notable copies of the *Elements*, among them a heavily annotated 1482 Ratdolt edition.

We then consider how Euclid featured in the teaching of mathematics in Ireland. Although instructional practices often resembled those in Britain, they were also shaped by links with Irish colleges on the Continent and, in at least one institution, by eighteenth century French pedagogical traditions. Through this discussion, the paper identifies cultural, linguistic, and educational conditions that preceded—and may have delayed—the appearance of Euclid in Irish.

Against this backdrop, we examine the earliest known translation of Euclid by Irish language scholar John O'Donovan in the mid nineteenth century. Although his reasons for translating Euclid remain unclear, his work raises an important question: how did he choose or devise Irish words for mathematical terms if there was no earlier Gaelic mathematical tradition to draw from? In 2026, more students learn mathematics formally through Irish than at any previous period, making the origins and evolution of Irish mathematical terminology relevant for understanding past and present vernacular engagements with Euclid.