

Émilie, an Opera about Love, Death, and Mathematics

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Abstract

Kaija Saariaho's opera *Émilie*, based on the life and death of the mathematician Émilie du Châtelet (1706–1749), with a libretto by Amin Maalouf, premiered at the Opéra National de Lyon in 2010. We present its historical background, creators, storyline, musical score, performance history, and critical reception.

Introduction

There are quite a few novels, plays, and movies – but not so many operas – on the lives of famous mathematicians. As recent examples, let us mention *Ramanujan* (an opera composed by Sandeep Bhagwati on Srinivasa Ramanujan; premiere on 21 April 1998 at the Prinzregententheater in Munich), *Die Vermessung des Unendlichen* (an opera composed by Ingomar Grūnaeur on Georg Cantor; premiere on 10 November 2006 at the Opernhaus Halle), or *Dr. Dee* (2011; an opera composed by Damon Albarn on John Dee; premiere on 1st July 2011 at the Palace Theater in Manchester.)

Here we will focus on *Émilie*, an opera by the Finnish female composer Kaija Saariaho, which – unlike the previously mentioned examples – has had performances in several countries and has enjoyed worldwide recognition. Both of the present authors have seen its international premiere at the Opéra National de Lyon on 1st March 2010 and its Finnish premiere in Helsinki on 2nd April 2015 and published critical reviews (mainly in Finnish.) We have also co-organized an international conference on 1–2 April 2015, in the premises of the Finnish National Opera house, bringing together mathematicians and musicians from many countries to discuss *Émilie*, its historical background and the work of Saariaho at large. Some of the material of that conference has been published in the Winter 2016 issue of *The Mathematical Intelligencer*.

Historical Background

Émilie is closely based on the true story of the French mathematician Émilie du Châtelet (1706–1749), one of the first female characters to leave a mark in the history of mathematics. She was born into a noble family with a large house in the center of Paris, next to the gardens of Tuileries. The father, Baron Louis-Nicolas Le Tonnelier de Breteuil, was in charge of introducing foreign ambassadors in the court of Louis XIV. Émilie was a child prodigy, excelling both in languages and in mathematics, and she was given an education corresponding to her talent – which was by no means self-evident for a female child even in aristocratic circles. There was an atmosphere of Enlightenment in the household which had a well-equipped library and where Émilie learned to know already as a child figures like Fontenelle, Rousseau, and Voltaire. At age 19, she was married to Marquis Florent-Claude du Chastellet-Lomont, a harsh soldier with few intellectual occupations. They had three children, two of which, a boy and a girl, survived to adult age. Émilie would be styled as Marquise du Châtelet (she changed the orthography of the family name on Voltaire's suggestion.) Émilie's daughter was put in a convent school and her son got a preceptor, as was customary. Having thus fulfilled her motherly obligations, Émilie liberated herself from ordinary married life and, with the full consent of her warrior husband, had quite a few extramarital

relationships. Such an astonishing arrangement was possible in the freewheeling aristocratic circles of 18th century France. There were as many as four members of the Académie française among Émilie's lovers: most famously, of course, Voltaire, but also Marshall Richelieu (a grandnephew of Cardinal Richelieu), the mathematician Maupertuis, and the poet Saint-Lambert. Émilie became well-known as an enterprising amateur scientist, and indeed she would be remembered as the first woman in France to be involved in a public scientific dispute with a male academician on a question of natural science. The topic was the notion of so-called *vis viva* which had to do with the conservation laws of mechanics.

Émilie had learned higher mathematics, i.e., calculus, first from Maupertuis with whom she was romantically involved around 1734; then also from Clairaut – another former child prodigy who had produced his first paper at age 13. Maupertuis and Clairaut had been members of a geodetic expedition that travelled to Finnish Lapland in 1736–1737 to measure the shape of the Earth. They famously proved Newton's prediction that our planet, due to its rotational movement, is slightly flattened around its poles, thereby providing large-scale evidence for the validity of Newton's Law of Universal Gravitation. Their undertaking was followed by Émilie with keen interest. Maupertuis and Clairaut, together with the philosophical lovers (“*philosophes très voluptueux*”) Émilie du Châtelet and Voltaire – who spent fifteen happy years together in the castle of Cirey in Champagne – were the most important proponents of Newtonian ideas in France. Indeed, it would be Émilie du Châtelet's most important contribution to history of science to translate Newton's *Principia* into French, and not only to translate it but rewrite it in a more modern notation, thereby combining Newtonian and Leibnizian approaches to calculus [1].

Émilie's *opus magnum* was achieved in dramatic circumstances. After her relationship with Voltaire had come to an end, she found yet another lover, the poet Saint-Lambert, whom she met in the castle of Lunéville in Lorraine, the flamboyant court of Stanislas, a former king of Poland who had become the father-in-law of Louis XV. Saint-Lambert made her pregnant at the age of 42, a dangerous age to give birth in the 18th century. Émilie realized that she might perish in childbirth and used the remaining time of her life to fulfil her grand project of translating the *Principia*. She gave birth to a girl on 4 September 1749 and passed away six days later. Three men gathered at her deathbed: Voltaire, Saint-Lambert and the legal husband (who recognized the baby as his own.) Émilie has dated, with a trembling hand, her manuscript on her day of death, 10 September 1749. The manuscript was handed to a priest, and forwarded to Clairaut who published it ten years later, in June 1759. The chosen publishing date was dramatic because Halley's Comet had in the spring of that year returned to the skies exactly as predicted by the immutable Newtonian laws of Celestial Mechanics. Émilie's translation of *Principia* was so good that it was used as such for more than two centuries in France. A new critical edition has recently appeared [4].

Voltaire wrote the following lines to the memory of his former mistress:

*L'univers a perdu la sublime Émilie!
Elle aimait les plaisirs, les arts, la vérité.
Les dieux, en lui donnant leur âme et leur génie,
n'avaient gardé pour eux que l'immortalité.*

The scholarly literature on Émilie du Châtelet is vast; a systematic bibliography can be found in [1]. She has also become an icon of feminism, thanks not only to her unusual career but to the preface of her translation of Mandeville's *Fable of the Bees* and to her philosophical study *Discours sur le bonheur* in both of which she argues, among other issues, for women's rights to education. The latter treatise has recently been translated into many languages (including a Finnish translation by O. Pekonen.) Émilie's figure has proved fertile for various artistic interpretations, such as the plays *Legacy of light* by Karen Zacarias (2009), *Émilie: La Marquise du Châtelet defends her life tonight* by Lauren Gunderson (2009) and *Urania: the life of Émilie du Châtelet* by Jyl Bonaguro (2014), or the French television movie *Divine Émilie* by Arnaud Ségnac (2007). In 2006, a major exhibition to commemorate her tricentenary was organized in the National Library of France. There is a minor planet, a French research institution of gender issues, and a street in Paris named after her.

The Creators of the Opera

Kaija Saariaho – the composer. Kaija Saariaho (born in Helsinki 1952) is regarded as the foremost contemporary composer of Finland – a country with a particularly vibrant musical life – even if she lives since 1982 in Paris with her French husband and family. She studied composition at the Sibelius Academy in Helsinki under Paavo Heininen, at the Hochschule für Musik Freiburg under Brian Ferneyhough and Klaus Huber, and experimented with computer-assisted music at IRCAM (Institut de Recherche et Coordination Acoustique/Musique) in Paris. Soundscapes created with the help of synthesizers and electronics alongside traditional instruments are in use in many of her compositions. We focus here on her music for stage. At the time of writing of this paper, there have been premieres of four of her operas and one oratorio. The operas are: *L'Amour de loin* (premiere at the Salzburg Festival in 2000; a love story set in the Middle Ages); *Adriana Mater* (premiere in the Opéra Bastille in 2006; a tale of rape amidst war and redemption through motherly love); *Émilie* (2010); and *Only the Sound Remains* (premiere at the Dutch National Opera in 2016; based on two Japanese Nôh dramas.) The oratorio *La Passion de Simone* (premiere at the Jugendstiltheater in Vienna in 2006) may also have special relevance for mathematicians as it tells the story of the philosopher Simone Weil (1909–1943), the sister of the mathematician André Weil (1906–1998) [6]. Kaija Saariaho has been awarded with many prizes and honors. A recent highlight of her career was the performance of *L'Amour de loin* at the Metropolitan Opera in December 2016. Saariaho made history because she was only the second woman whose opera has been presented by the company. Moreover, the Finnish conductor Susanna Mälkki, who often conducts Saariaho's works, was only the fourth woman ever to take the podium in Met Opera's history. One of us has devoted a doctoral thesis [2] to *L'Amour de loin* which is the most successful of Saariaho's operas.

Amin Maalouf – the librettist. Amin Maalouf (born in Beirut 1949) is a Lebanese-French writer who had to flee the Lebanese Civil War in 1976 and settle in Paris. He is the author of several bestselling novels, written in French and translated into many languages, many of which have a historical theme. He is a recipient of Prix Goncourt (1993) and since 2011 a member of the Académie française. He has contributed the libretto (in French) for the first three of Saariaho's above-mentioned works [5].

Peter Sellars – the director. Peter Sellars (born in Pittsburgh 1957) is one of America's foremost theatre directors who also teaches at the UCLA. He has directed the premieres of all the above-mentioned Saariaho's works for stage. Among his numerous other productions (some of which have been quite controversial) let us mention here *Doctor Atomic*, an opera by John Adams (2005) whose lead character is J. Robert Oppenheimer.

The interpreters. Kaija Saariaho often composes with specific artists in mind. *Émilie* is an 80-minute monodrama for soprano, and quite demanding to perform. Its dedicatee was the Finnish soprano Karita Mattila in whose character the composer saw something of *Émilie*. The other performers hitherto have been Elizabeth Futral, Barbara Hannigan, Karen Vourc'h, Agnessa Nefjodov, and Camilla Nylund.

Storyline and Score

The monodrama is set in Lunéville, and its action takes place on Monday 1st September 1749, perhaps at nighttime as there may be candles in the staging. *Émilie* is aware of her approaching death. She keeps awake, haunted by memories from the past. There are nine scenes, played without an interval. Each scene bears a title (Forebodings, Tomb, Voltaire, Rays, Meeting, Fire, Child, Principia, Against Oblivion) and carries its specific musical material, tempo and evolution. *Émilie* also has interlocutors, but it is the soprano's own voice which gets computer-enhanced and real-time transformed into disembodied male voices of her lovers and, briefly, of her unborn child [3]. While she writes a letter to Saint-Lambert, her quill is made to function like a musical instrument. She gazes not only towards the past but into the

future, wondering how she might be remembered: What would be written on her tombstone? A recurring question is whether she will be remembered at all, or fall into oblivion.

Much of *Émilie*'s scientific work had to do with the problem of the nature of fire and Newton's ideas of rays of light and colors. Similar themes are ubiquitous in Saariaho's music; indeed, she has sometimes characterized herself as a synesthetic composer. Gradual transitions in the dynamics of her vast soundscapes from one pitch cluster to another or from loud to quiet could be compared with slow changes of temperature, color or brightness so typical of natural processes. The central instrument of *Émilie* is harpsichord whose presence creates an overall 18th century atmosphere. A scene where *Émilie* sings to her unborn child borrows a theme of Scarlatti which reveals itself progressively while being expanded and subsequently deformed. "I already miss the colors", *Émilie* sings before falling into unconsciousness, with images of otherworldly strange suns whirling in her mind.

Performance History and Critical Reception

The dates refer to premieres:

- 1st March 2010, Opéra National de Lyon, France, soprano: Karita Mattila
- 18 March 2010, Het Muziktheater, Amsterdam, Netherlands, soprano: Karita Mattila
- 29 May 2011, Spoleto Festival, Charleston, SC, soprano: Elizabeth Futral
- 19 July 2012, Lincoln Center Festival, New York, NY, soprano: Elizabeth Futral
- 17 January 2013, Fundação Calouste Gulbenkian, Lisbon, Portugal, soprano: Barbara Hannigan
- 9 October 2013, Casa da Musica, Porto, Portugal, soprano: Karen Vourc'h
- 24 May 2014, Salzburger Landestheater, Salzburg, Austria, soprano: Agnessa Nefjodov
- 2nd April 2015, Finnish National Opera, Helsinki, soprano: Camilla Nylund

Let us conclude with a couple of quotes of the critics:

"An unmistakably Scandinavian feeling for massive but radiant texture, for effects of light, elides in her work with a very French affinity for experimental timbre, with the 'spectralist' harmonic innovations of her Parisian contemporaries, and the subtilisation of music lengthily explored in Ircam, the Paris underground electronic studio, where she studied." – Paul Driver, *The Sunday Times* (7 March 2010)

"Throughout the opera, the score glistens with color and light – two concepts of abiding interest to the scientist *Émilie*. The opening scene, 'Forebodings,' layers icy harpsichord pinpricks over trilling winds, uneasy marimba figures, and the pullulating whirl of the strings, which dive repeatedly into swooning chromatic sighs. These motifs recur throughout the opera, especially in the final tableau, when the title character, proud and ambitious, ponders with anguish the possibility of oblivion, 'the vertigo of unconsciousness.' Fire – the burning of the sun in the heavens and of the hunger for knowledge and fulfillment within *Émilie* – flickers in the almost toneless hissing of flutes. As *Émilie* contemplates death, desolate arpeggios sound over the metallic drone of the harpsichord." – Marion Lignana Rosenberg, *The Classical Review* (20 July 2012)

References

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