

Elise Grosjean

*Mathematics
and
Art:
Exploring
Connections*

A TALK
BY
ÉLISE
GROSJEAN



$$\rho \left(\frac{\partial u}{\partial t} + u \frac{\partial u}{\partial x} + v \frac{\partial u}{\partial y} \right) = - \frac{\partial p}{\partial x} + \mu \left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} \right) + \rho g_x$$

**1 NOVEMBER 2024 AT 5 PM
AT LA GALERIE
ALLIANCE FRANÇAISE DE DHAKA**

26 Mirpur Road, Dhanmondi

Open to all

This talk precedes Élise Grosjean's exhibition opening at 6:30 pm.
The exhibition will run until 9 November. All are welcome.

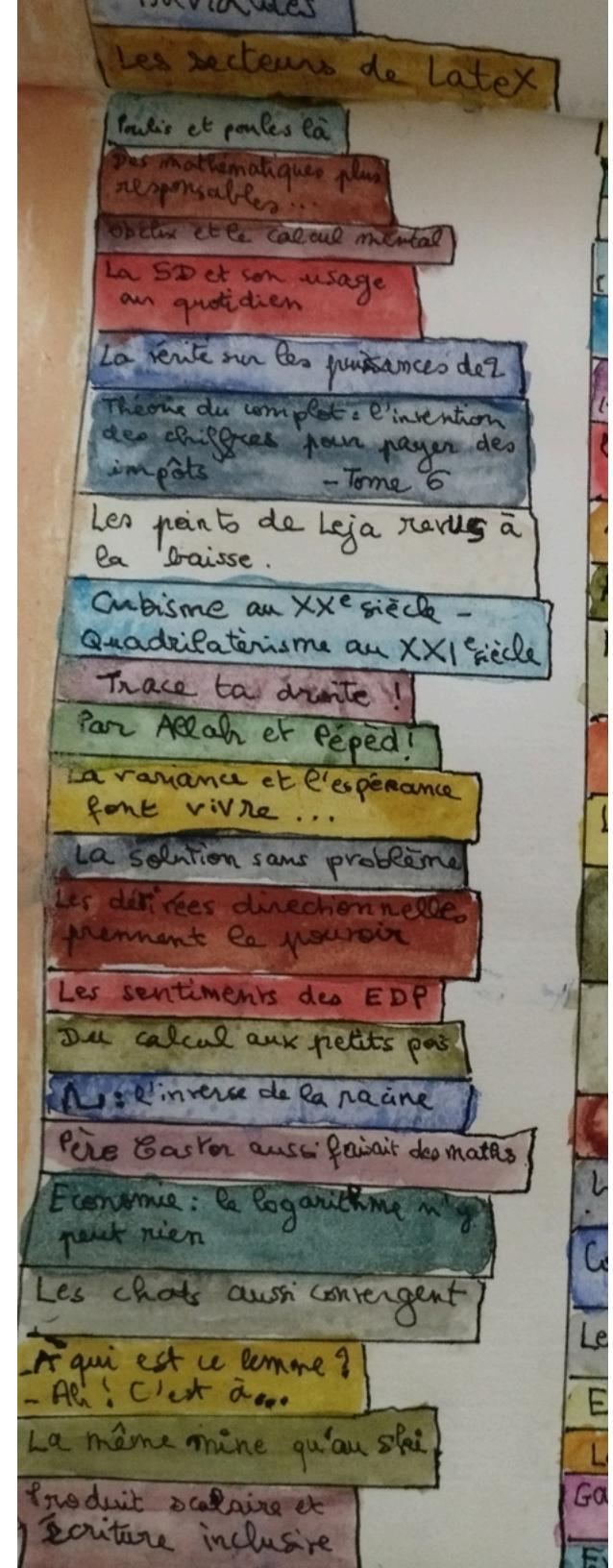
I am an assistant professor
at the ENSTA engineering school
and an artist
hence the mathematical inspirations...
Since 2023, I follow
very enriching courses
with "les ateliers de Paris"

Re-take exam



A4

Pigments cooked on glue
2023



Henna (Mehndī) inspiration







One striking aspect of Grosjean's body of work is her application of miniature motifs. It may sound minimalist but they uphold the most details.

FINELY TINY

A mathematician's artistic geometry

ART

AUNIM SHAMS

French artist Élise Grosjean's solo exhibition 'Finely Tiny' juxtaposes art with mathematical formulae and geometry in a symphony of colours

If you grew up in Bangladesh and attended a school under the NCTB (National Curriculum and Textbook Board), you'd likely agree that art and mathematics didn't exactly go hand in hand.

It was almost as if students were split between two vastly dif-

ferent worlds—Science (covering physics, chemistry, and mathematics), and on the other end was arts. There are little to no opportunities for these two sides to intersect and unify calculations and creativity in this curriculum.

Coming from a similar schooling background, I believe you can understand my bemusement when Alliance Française de Dhaka hosted an art exhibition on 2 November (open till 9 November) where the artist claimed to have integrated mathematics into her artwork.

The concept would either make you yawn (especially if you were a backbencher at school like yours truly) or would drag you to a newfound appreciation for the intricacy and juxtaposition of artistic ideologies and mathematical formulae. Elise Grosjean implemented in her solo exhibition 'Finely Tiny.'

"I teach math and I have been drawing ever since I could remember so I have had a good grasp of both fields since childhood," Elise Grosjean

I SEE PAGE 14 COL 2



When Élise is not solving complex mathematical equations as an assistant professor, she is curled up in drawing and painting with every chance she gets. Apart from the one common denominator present in her two divergent passions of art and math—her love for intricate geometric designs, a blend of different cultures is also present in her work.

TBS PICKS

A selection of artworks with comments from Élise Grosjean



KITE (2022)
Medium: Acrylic and ink on paper

It has a touch of Mughal design. Besides the kites, I've included windows that resemble Mughal-style patterns. The windows feature many designs, adding to the aesthetic. The piece is colourful, as kites need to capture children's imagination through perspective.



SILHOUETTE (2012)
Medium: Fineliner pen, Indian ink and watercolour on paper

Each of my pieces always centres on one main subject. Here, you can see the silhouette of a woman who is crying. Hidden within the painting are small details of her daily life—there's a piano tucked somewhere, suggesting she might play it. Scattered strings also appear, hinting that she might sew. She is related to all of these objects.



A BLUE AND RED ELEPHANT (2012)
Medium: Acrylic, soil paste, and ink on paper

I like to draw hidden forms. It's something we can see at first glance, but if you observe closely, small tails emerge on a bigger scale. You also see there is one message and another also see the elephants.

PHOTO: Md HASAN



আলিয়স ফ্রেজে এলিজের চিত্র প্রদর্শনী

আলিয়স ফ্রেজে দ্য ঢাকায় ১
নভেম্বর উদ্বোধন হয়েছে এলিজ
প্রোজেক্টের একক চিত্র প্রদর্শনী
'ফাইনলি টাইনি (Finely
Tiny)'।

ছোটখেলা থেকেই এলিজের
শিল্পাত্মা শুরু।
নিজের হাতে মেহেদি দিয়ে
অঙ্কন এবং পরবর্তীকালে
কাগজেও অনেক কিছু আঁকতে
থাকেন। ক্ষুলের একবেয়েমি
থেকে মুক্তি পেতে তিনি তার
ডায়েরি রঙিন ও কল্পনাপ্রসূত
অঙ্কনে ভরিয়ে তোলেন।
তার একাডেমিক পথ ছিল
আলাদা কিন্তু আকাশাকির প্রতি
আগ্রহ অব্যাহত ছিল সবসময়।

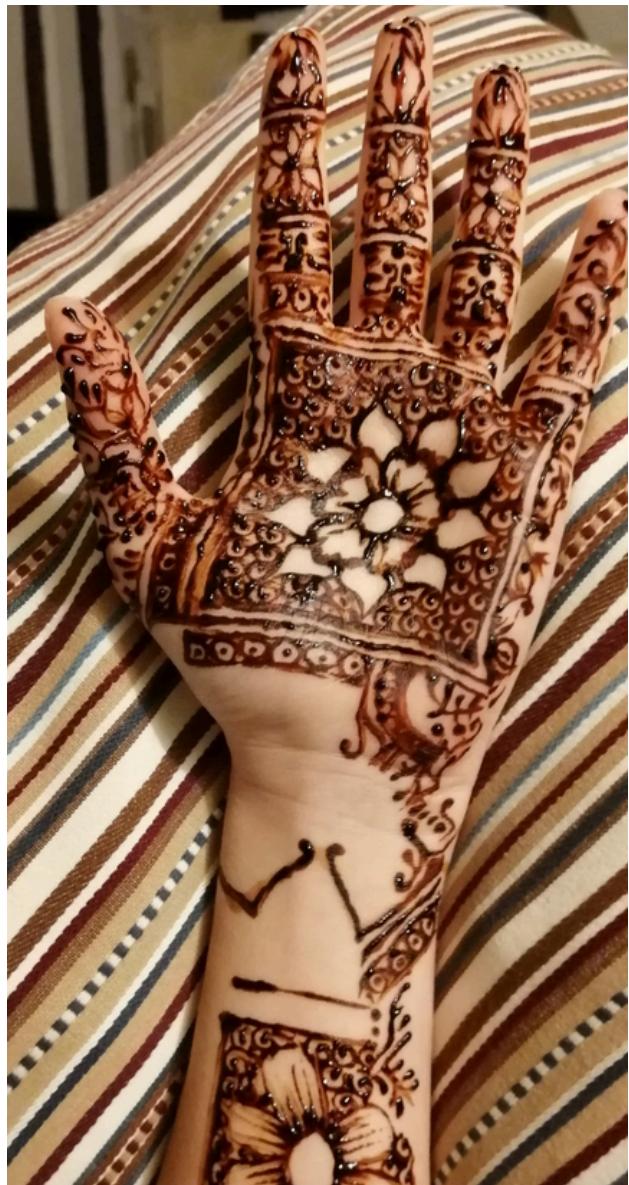


এলিজ গণিতে ডট্টেরেট
(পিএইচডি) লাভ করেন এবং
ফ্রাসের বিখ্যাত বিশ্ববিদ্যালয়
ENSTA-Paris-এ সহকারী

অধ্যাপক হিসেবে কর্মরত। তার
গ্রন্থগ্রাম মূল বিষয় 'শারীরিক
ঘটনার সিম্পলেশনের জন্য
সংখ্যা পদ্ধতির উন্নয়ন'।
কাজের অবসরে যখন স্বয়েগ
পান বা মখন জটিল গণিতের
সমীকরণ সমাধানে ব্যস্ত নন,
তখন এলিজ আকতে
ভালোবাসেন পেনসিল, কালি,
তেলরং, আঞ্চলিক, জলরং,
রঞ্জক, কোলাজ এবং লবণ-
ময়দার মতো বিভিন্ন প্রযুক্তির
মাধ্যমে পরীক্ষা করে।



গণিত এবং শিল্প, দুটি ভিন্ন
প্রকৃতির এ আবেগের মধ্যে যা
সম্পর্ক তৈরি করে, তা হলো
জটিল জ্যামিতিক প্যাটার্নের
প্রতি তার ভালোবাসা। এ
সংযোগটি শিল্পীর 'ক্লাসরুম'
এবং 'রোমিও ও জুলিয়েট-
গণিতজ্ঞ সংস্করণ' নামক দুটি
ছবিতে বিশেষভাবে প্রতিফলিত
হয়েছে, যা প্রদর্শনীতে দেখা
যাবে।
প্রদর্শনী সবার জন্য উন্মুক্ত।
চলবে ৯ নভেম্বর পর্যন্ত।
প্রতিদিন বিকেল ৩টা থেকে
রাত ৯টা পর্যন্ত।



*diary pages (ink and markers) and revisited Indian flag
(collage and acrylics)*

*50*32*



*I started drawing in middle school,
first on skin with henna (or Mehndī in Hindi)
then on paper, with inspiration from numerous
trips to India. I drew very often during classes,
and I actually kept a few sheets of my colorful diaries.*

*Since then, in most of my drawings,
we find numerous Mehndi patterns and tribal models...*

Silhouette



*Chinese ink and watercolour
(80 * 120)
2012*

Hexagon



25*40

Chinese ink
2012

Square



20*30
Chinese ink
2012



Chinese ink
2024

Japanese at the Alhambra



120*40
Acrylics, inks and oil on canvas
2024

Meeting made absurd



*Oil on paper
(35 * 60)
2024*

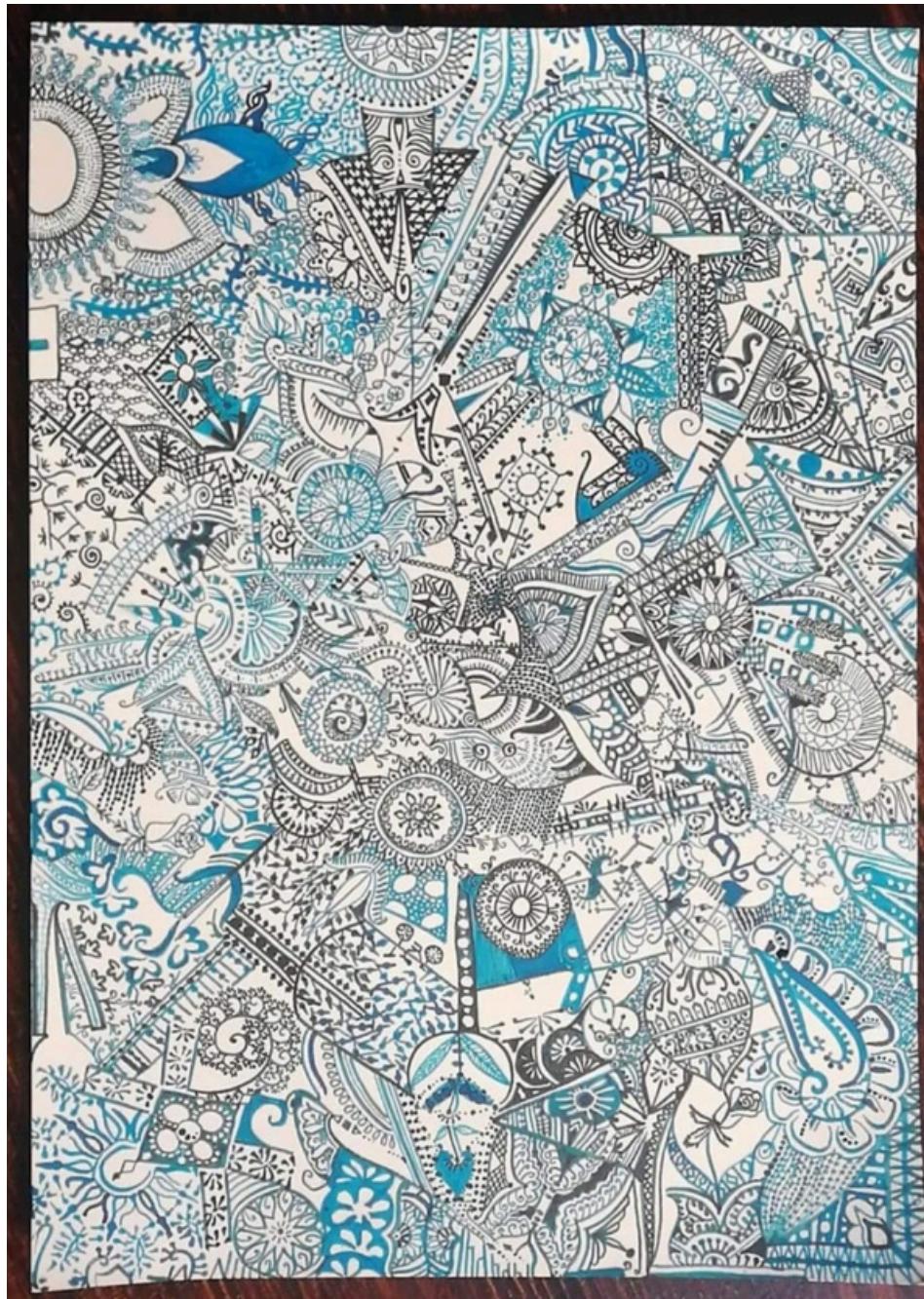


Music in perspective

50*65
Watercolour and inks
2023

- Pavane**
<https://youtu.be/mpgyTl8yqbw?si=IXzAyrXU4RMWG1NH> 0:07-1:12
- Swan-lake**
https://youtu.be/do6Ki6kMq_o?si=q1RPOMvFQT5p9B5x 1:05-1:12
- Aquarium**
<https://youtu.be/YVpl-RNzdE4?si=1baZrwGLo7dKVwb1> 0:00-0:06
- Nutcracker**
<https://youtu.be/-XizsI-YCr8?si=KmQ2-ZGbvtTl6tTDL> 5:07 - 5:12
- Symphony n1**
<https://youtu.be/ku2etgZ6olY?si=2swDZf4OEAvZzTP6> 1:10-1:20
- Firebird**
<https://youtu.be/TVakXOKE2G4?si=Cq7YJH1eaU-w3piy> 3:56-4:00
- Serenade**
<https://youtu.be/RZkIAVGIfWk?si=kkkhAHfRDUbgmXuz> 45:30 - 45:41
- Harpsichord concerto in D minor**
<https://youtu.be/ljLi9A0H8H4?si=HH51YfbJctSS-QYJ> 1:13-1:21
- La Bayadère - Nikiya variation**
<https://youtu.be/vn9BEU4G2zs?si=uUnbb09qBiAOErZS> 1:13-1:34
- Piano concerto n2**
https://youtu.be/A0A_rCATleM?si=G-uz8xL26SN9Brwy 1:54-2:15
- Aviary**
https://youtu.be/qYLWJWB5Rh8?si=92-5NiJF_b9tQppn 0:07-0:11
- The Grave of Couperin - prelude**
<https://youtu.be/-5o7lcpMDqs?si=t5-6rAG4Zw1MXGWz> 0:32-0:37
- Prelude n2 in C minor**
https://youtu.be/uaCPY4Plg14?si=WY3TGsAR1_drhcuD 1:37 - 1:46
- Le roi s'amuse - passepied**
<https://youtu.be/luc8k1RMMZc?si=jm6BcLSpNBPzbYOa> 0:00-0:06
- Petrushka - dance russe**
<https://youtu.be/eRyTyCTGhLo?si=8RBgrPBqpBRAiJ8L> 0:50 - 0:59
- Prince Igor - polovtsian dances**
<https://youtu.be/DgemQq14Sac?si=rc7rlvXUpTCgWCjV> 0:47-1:13
- Humoresque deux morceaux**
<https://youtu.be/zzJGeY42yGQ?si=j3LigEJzRT-PZolx> 0:00-0:05
- Carmen - dragons d'alcala**
<https://youtu.be/eRsHkVYjF8s?si=0beWfrGp3p5le-rK> 0:51-1:04
- Symphonic dances**
https://youtu.be/WYp3lSuH3yo?si=zRT1frFiJ_mGG5P0 3:16-3:29
- String quartet in F major - part II**
<https://youtu.be/GDs7JHIH6Ds?si=4ngARKQiGUhhp0DI> 0:00-0:06
- Pièces froides danse de travers - partie III**
https://youtu.be/XcCaNdVGqoA?si=-dW_h7cubG4pGUuM 0:00-0:06
- Serenade**
https://youtu.be/WXh0LN_3l80?si=8LylKDBeakkCrR6d 0:12-0:28
- Sonate bureaucratique**
<https://youtu.be/-hYr8w89Mew?si=99Acnr55AyJ8c0bx> 2:48-3:00
- The sleeping beauty - waltz**
https://youtu.be/_zKz38hNGmU?si=Cz

Monotych



*28*21
blue inks
2020*

Kite



50*70

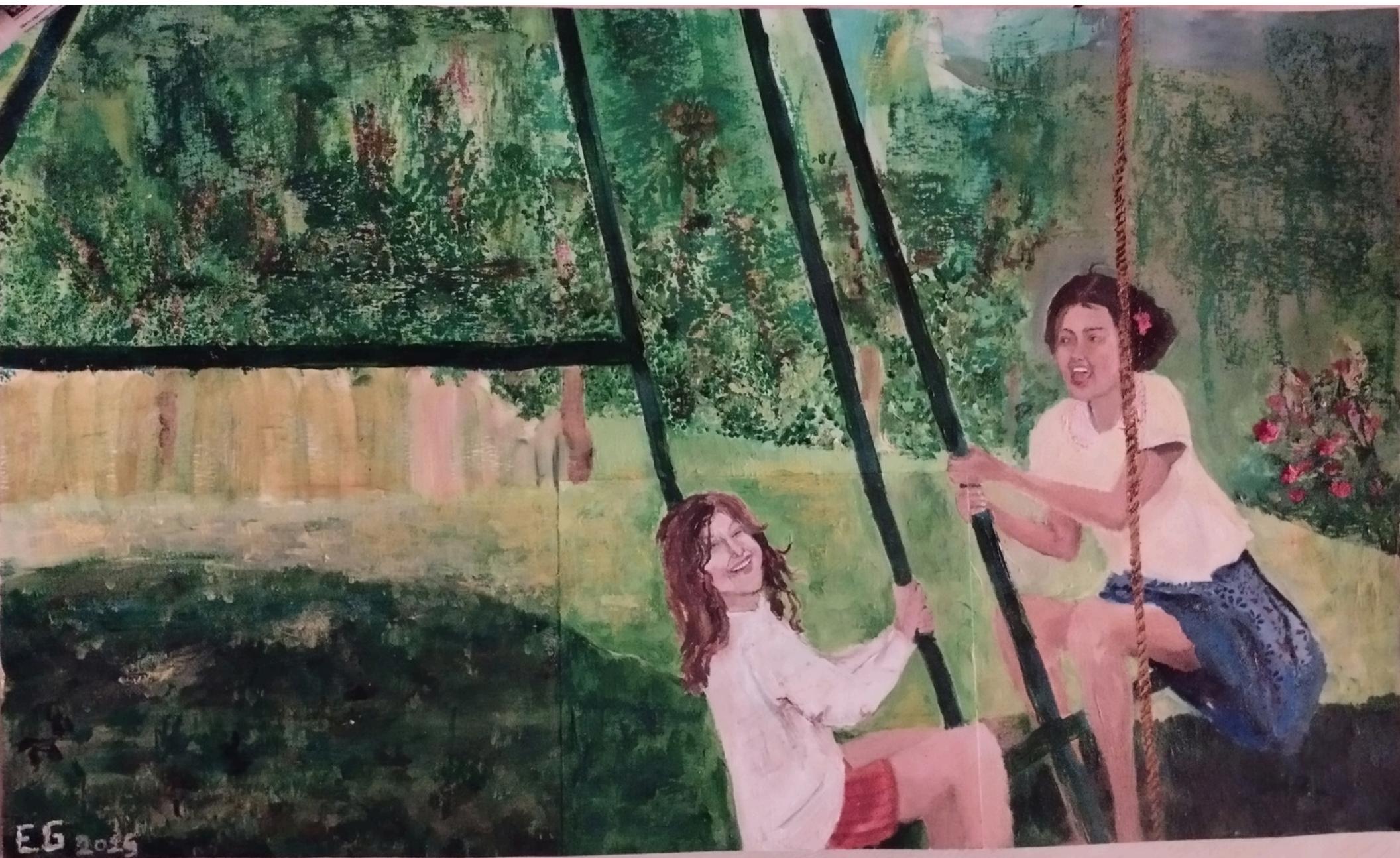
Acrylics, and inks
2022

Dreams



37*46
inks and watercolour
2013

Swing



EG 2025

*Oil and Kraft paper on paper
(35 * 60)
2025*

Stamps



50*70

Acrylics, and inks
2011

Print HELLO WORLD



60*80 - 2023

Watercolor, inks, oil painting, and collages (characters alone
in front of computers at their window with green shutters)

Vishnu

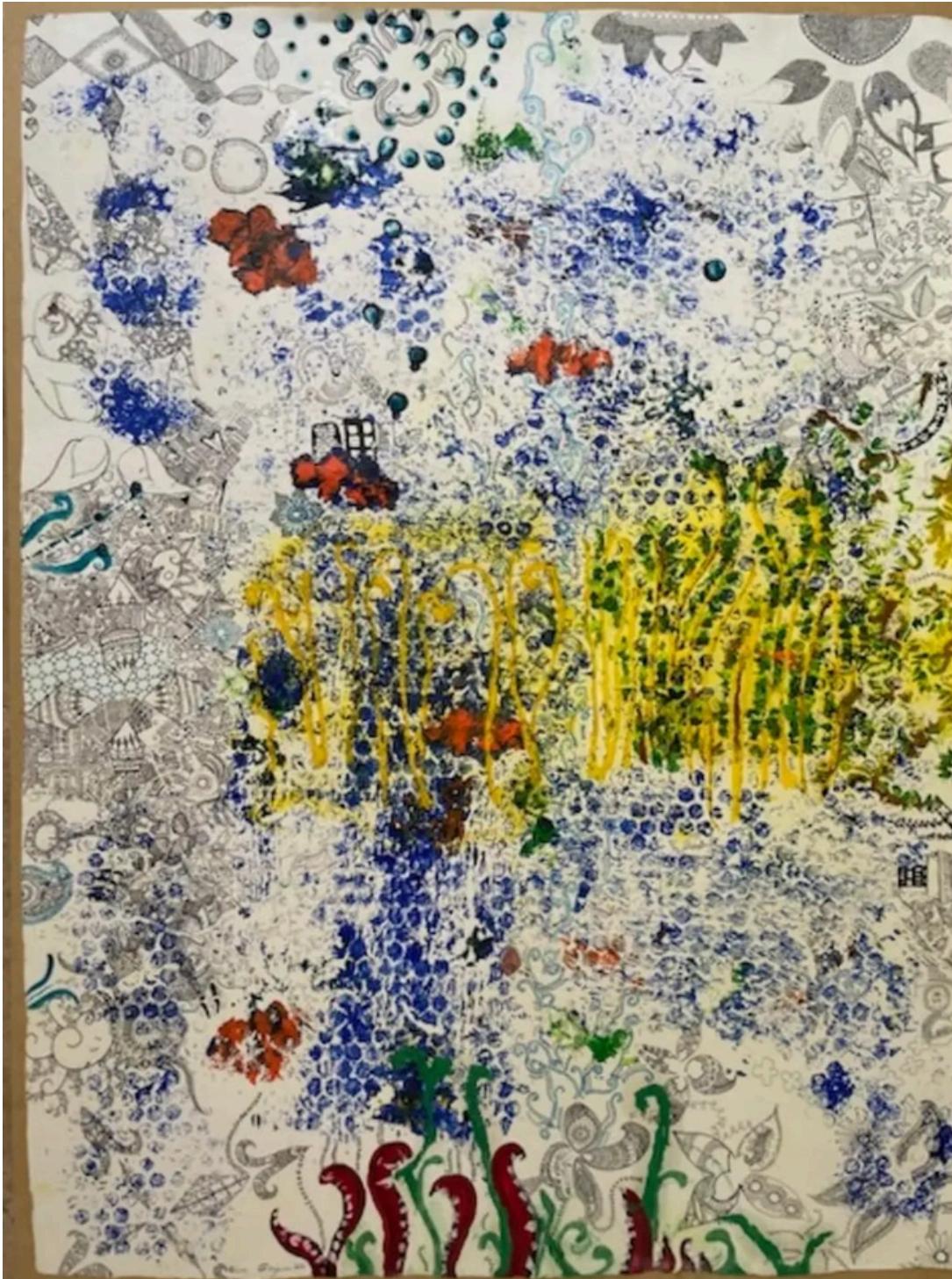


30*21
pastel on yardstick and pictures of
my hands with henna
2011

Aquarium



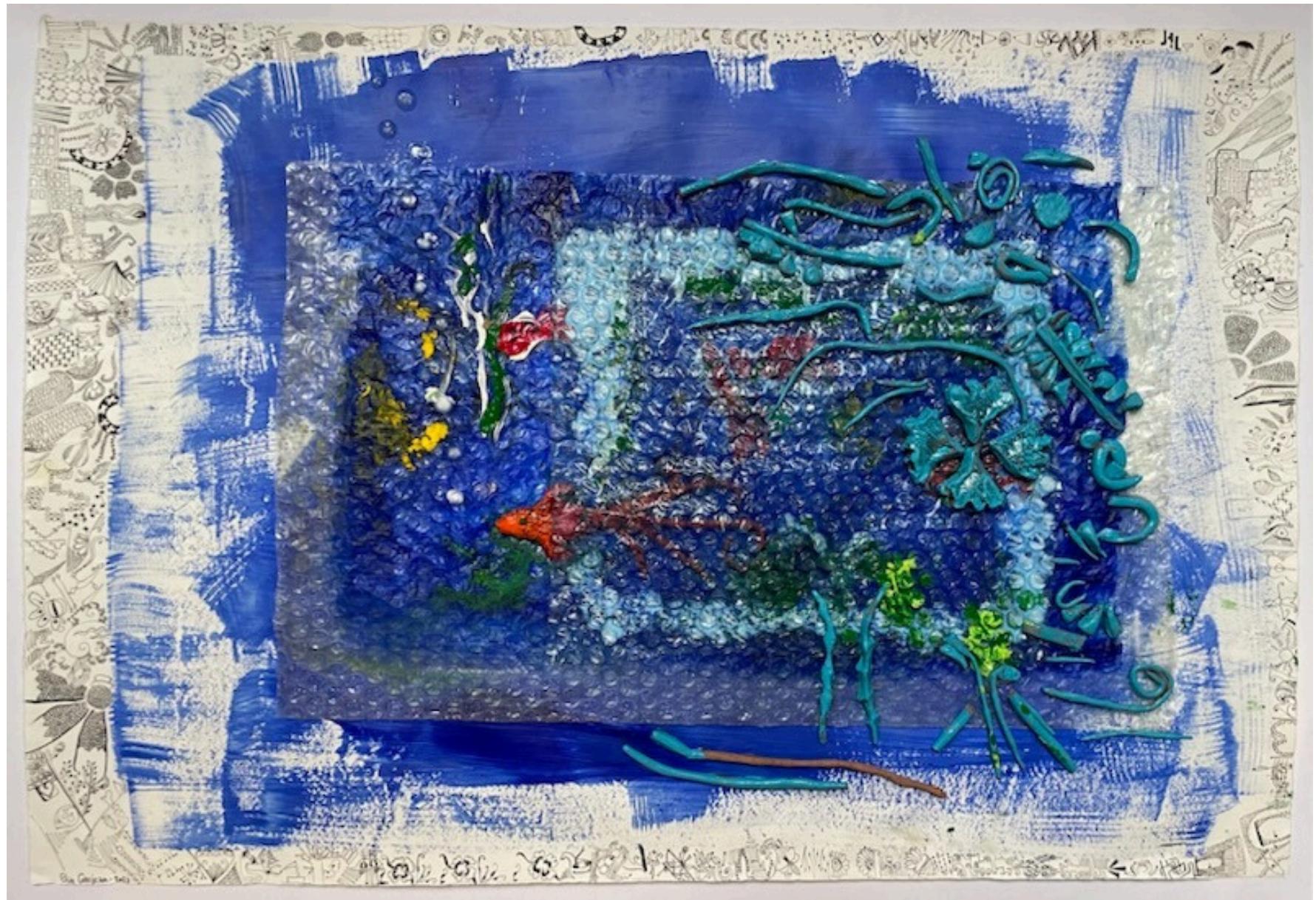
Aquarium 1/3



60*100
pastel, pencils
and Indian ink
2023



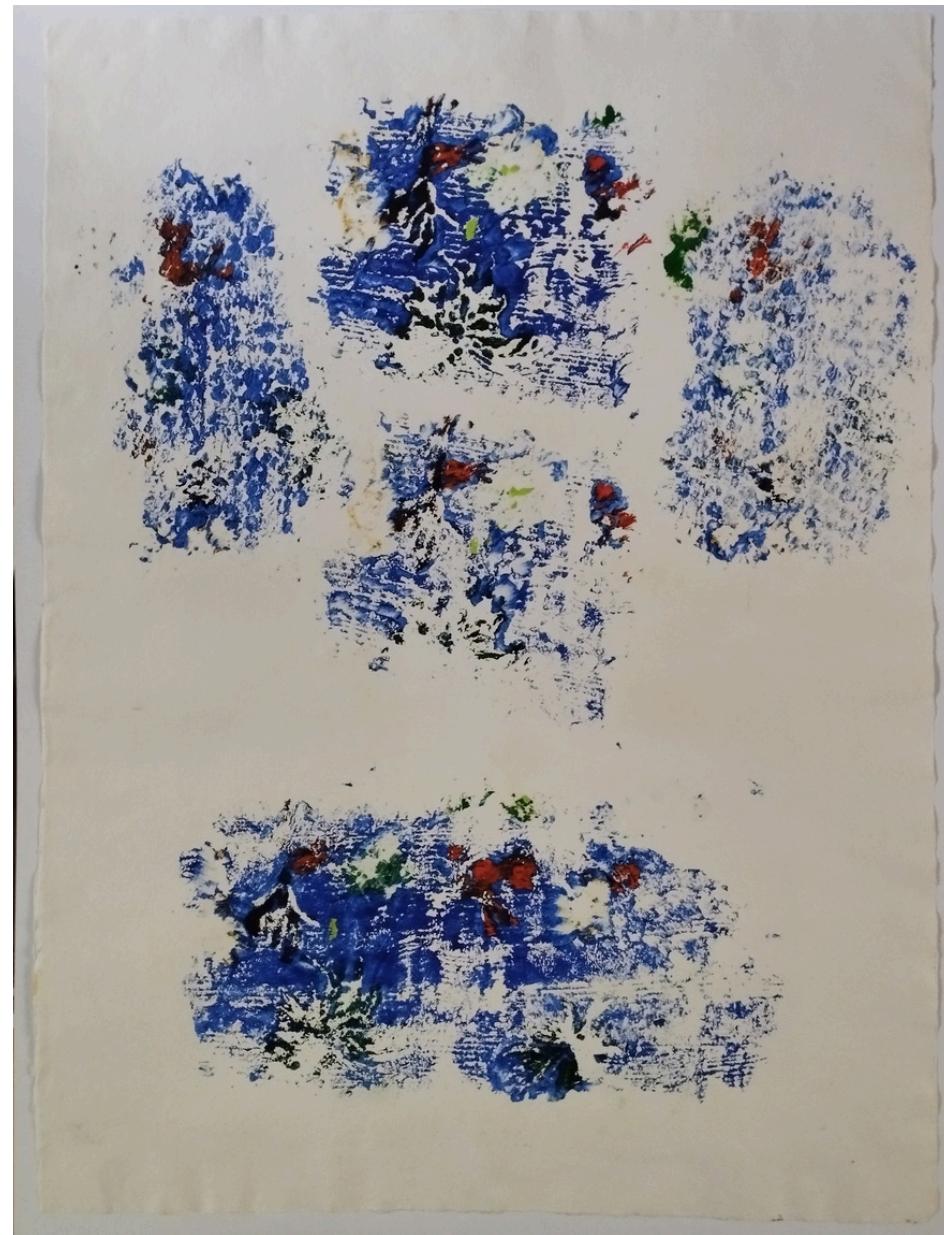
Aquarium 2/3



45*68

Acrylics, pigments, Indian ink, bubble wrap, salt paste
2023

Aquarium 3/3



60*80

*Acrylics, pigments
2023*

Romeo & Juliette - mathematicians version

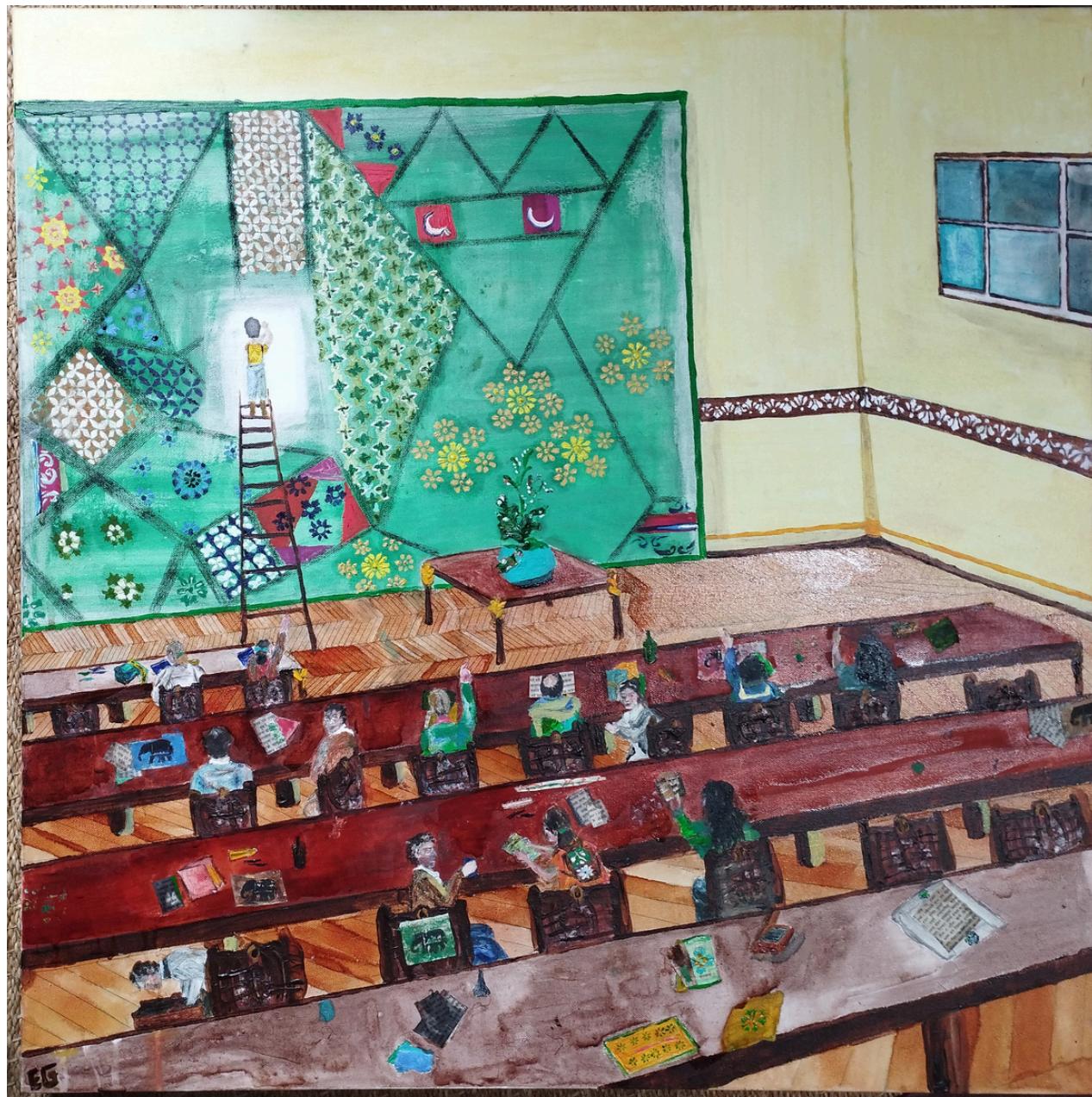


Cyanotype, watercolors, oil painting, collages and inks
60*80 - 2023

(Romeo - recognizable by his hat - offers flowers
to his beloved, sitting on her balcony, from where we
can see his library of mathematical books)



Taling at school



80*80
Acrylics, inks and oil on canvas
2024



Oil on paper
 $(35 * 60)$
2024

Coloured dialog



40*120

*Chinese ink and pastels
2016*

Manuscript



50*70
Acrylics
2022

Elephants



17*24

pastel, pencils and Indian ink



Green plants
2011



40*50
oil paint and henna



40*50
pastels and chinese ink

Triptych

2019

*Numerous ink drawings on
blocks of paper ...*



Cyclone



*Indian ink
2012*

Fir tree



60*80

Acrylics, collages, black, brown and gray inks
(colored tree from German newspaper advertisements)
Done in Kaiserslautern, 2022

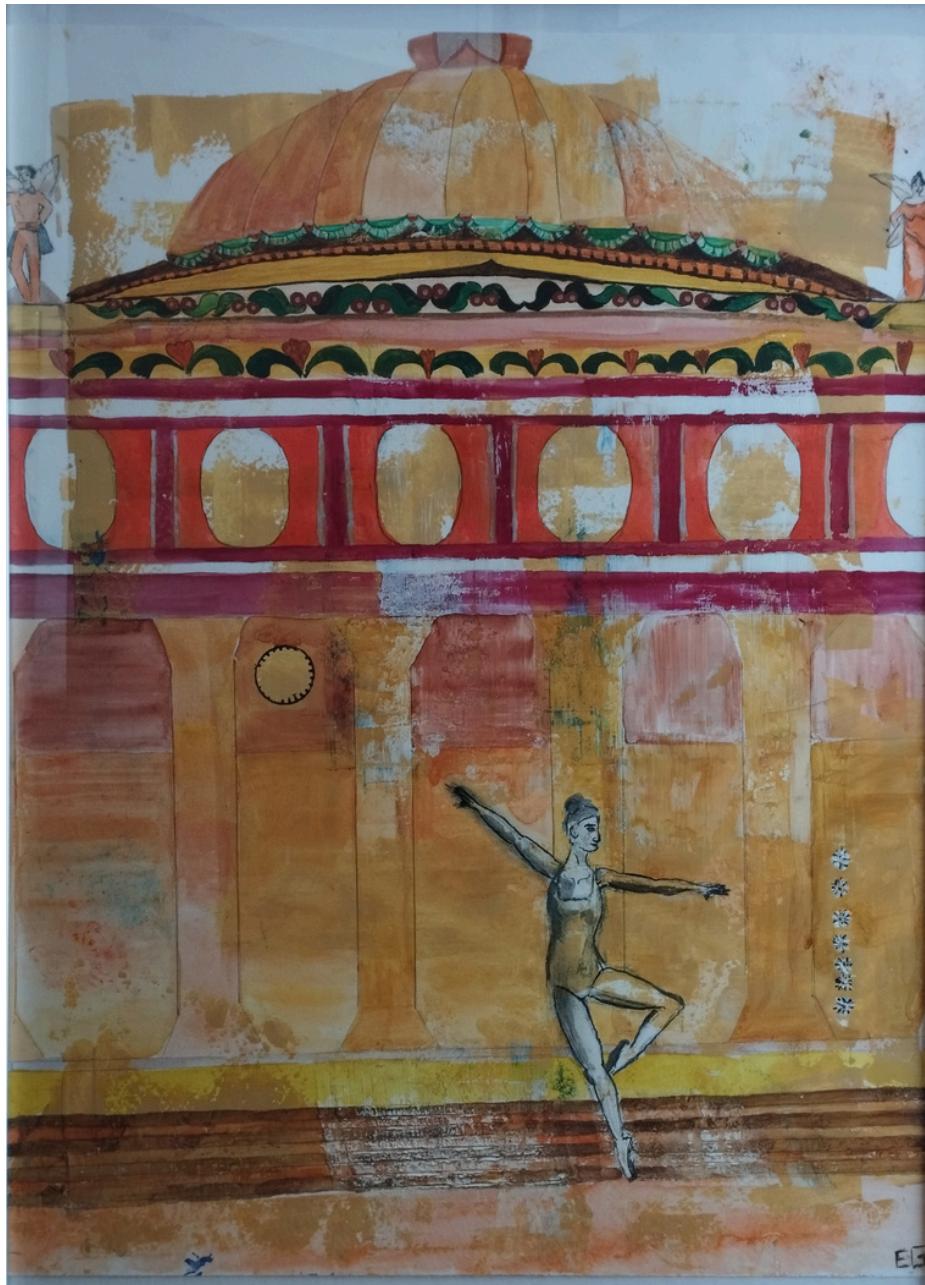
A blue and red elephant



140*80

*Acrylics, salt paste, inks
2018*

At the opera



60*80
2024

Knife oil painting with watercolours and Indian ink

Birds



20*20

Acrylics, collages, black ink, salt paste (on baking paper)
2022

Geometric shapes
Faces, hands and shallots



50*32 -2024
oil paintings and inks

Locomotive



50*70
black and gray indian ink
2018





*Pictures of my hand
with henna and
brown ink on paper
2011*

• Banach - Nečas - Babuška :

$u \in V$, $a(u, v) = \varphi(v)$ est bien posé ssi :

1/ condition inf-sup : $\exists \alpha > 0 \text{ tq } \forall v \in V, \sup_{w \neq 0} \frac{a(v, w)}{\|w\|_V} \geq \alpha \|v\|_V$

$$\Leftrightarrow \inf_{v \in V} \sup_{w \in W} \frac{a(v, w)}{\|v\|_V \|w\|_W} \geq \alpha$$

$$2/ a(v, w) = 0 \forall v \in V \Rightarrow w = 0$$

• Représentation de Riesz :

$$\|u\|_{L^2(\Omega)} = \sup_{w \in L^2(\Omega)} \frac{\int_{\Omega} uw}{\|w\|_{L^2(\Omega)}}$$

• Demy - Lions :

pour $k \geq m-1$

$$\min_{T \in \mathbb{R}_k^m} \|f - \pi\|_{W^{m,p}(T)} \leq C h_T^{-m} \|f\|_{W^{m,p}(T)}$$

• Poincaré - Wirtinger :

$$\inf_{f \in P^0} \|v - f\|_{L^2(T)} \leq C h_T \|\nabla v\|_{L^2(T)}$$

• Gronwall :

1/ forme intégrale : $\varphi \geq 0$ et $\Phi \geq 0$.

$$\forall t \geq t_0, \Phi(t) \leq K + \int_{t_0}^t \varphi(s) \Phi(s) ds$$

$$\text{alors } \forall t \geq t_0, \Phi(t) \leq K \exp \left(\int_{t_0}^t \varphi(s) ds \right)$$

2/ forme différentielle :

$$\text{si } \frac{d\Phi}{dt}(t) \leq \varphi(t) \Phi(t) \quad \forall t \geq t_0,$$

$$\text{alors } \Phi(t) \leq \Phi(t_0) \exp \left(\int_{t_0}^t \varphi(s) ds \right) \quad \forall t \geq t_0$$

• Rellich : $\Omega \in \mathbb{C}^1$

$H^1(\Omega) \hookrightarrow L^2(\Omega)$ est compacte

(de toute suite bornée de $H^1(\Omega)$ on peut extraire une sous-suite convergente dans $L^2(\Omega)$)

• Young :

$$ab \leq \frac{a^p}{p} + \frac{b^q}{q} \quad \left(\frac{1}{p} + \frac{1}{q} = 1 \right)$$

• Hölder :

$$\|fg\|_r \leq \|f\|_p \|g\|_q \text{ où } \frac{1}{r} = \frac{1}{p} + \frac{1}{q}$$

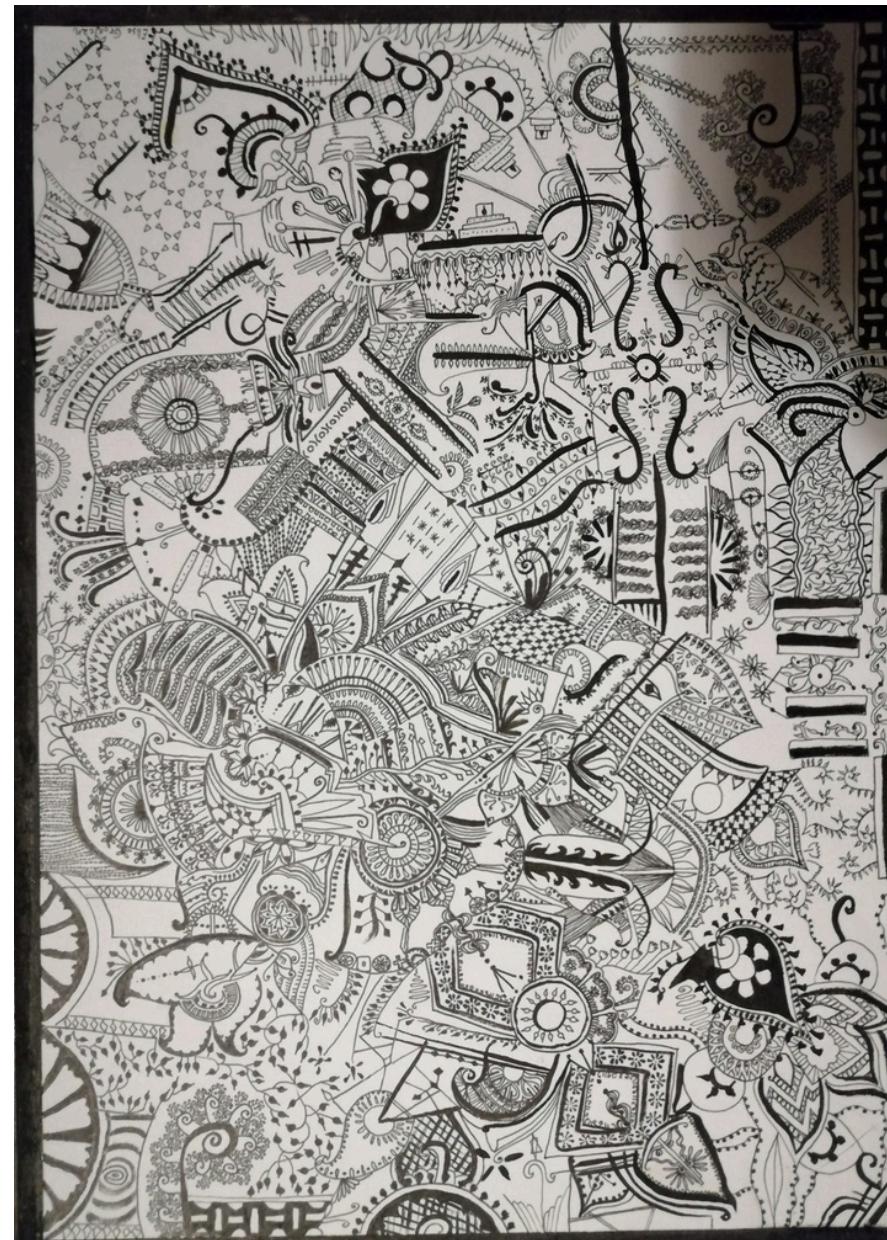
si $f \in L^p$ et $g \in L^q$

Bindings



21*30 Inks on paper - 2015

Black & White



21*30
black indian ink - 2018

Diptych



*Chinese ink on card stock
2011*



*Drawings on wall
collage, oil painting and markers*



graffiti



60*80

Acrylics, inks and collages
2022

Blue mist



65*50 - 2024

Shades of gray and blue (Cyanotype, henna and oil paint)

Blue mist



65*50 - 2024

Shades of gray and blue (Cyanotype, henna and oil paint)

16*24 - 2023



oil paint

Patchwork



34*45
Acrylics, collage and inks
2022

Attention ! (Watch out !)

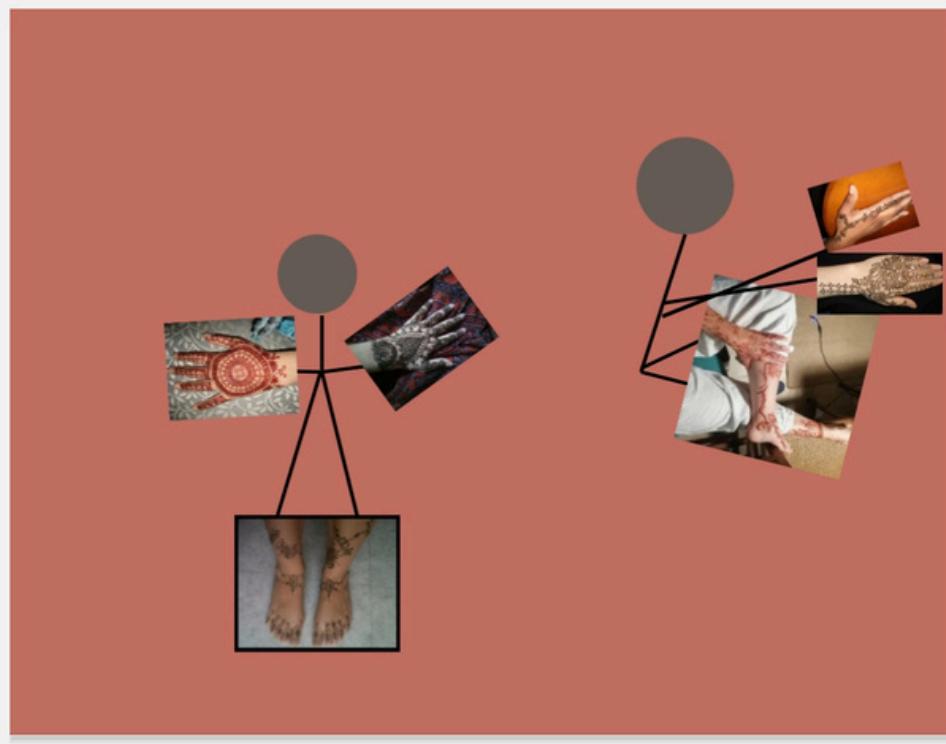
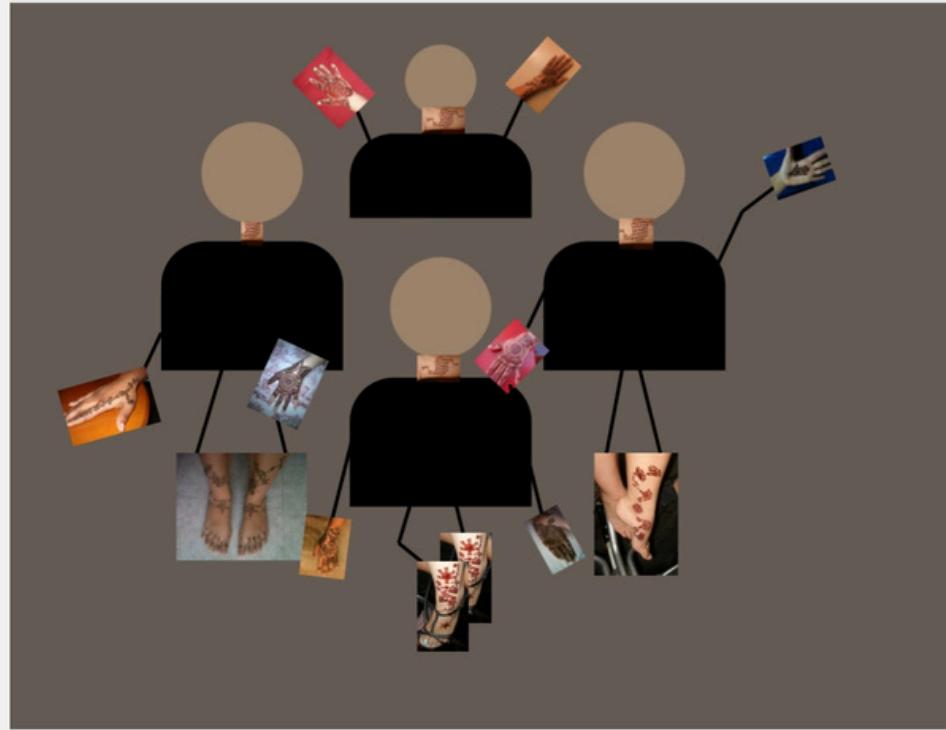


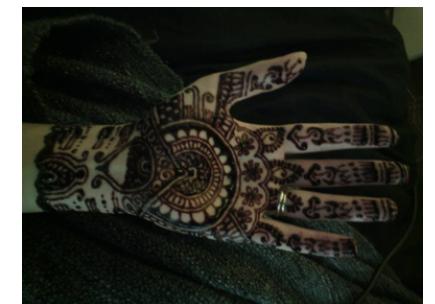
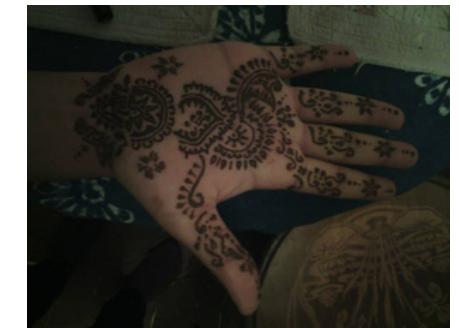
25*18
2010
Thin paper

Perched

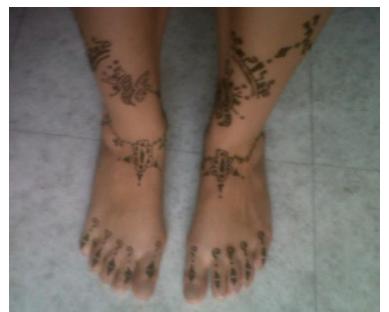
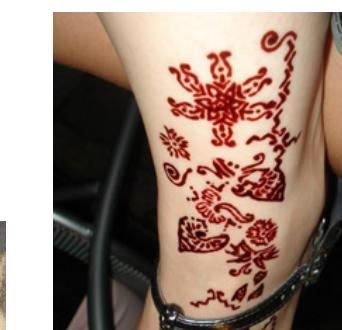


21*30
Pencil
2022





Some henna designs



mashrabiya



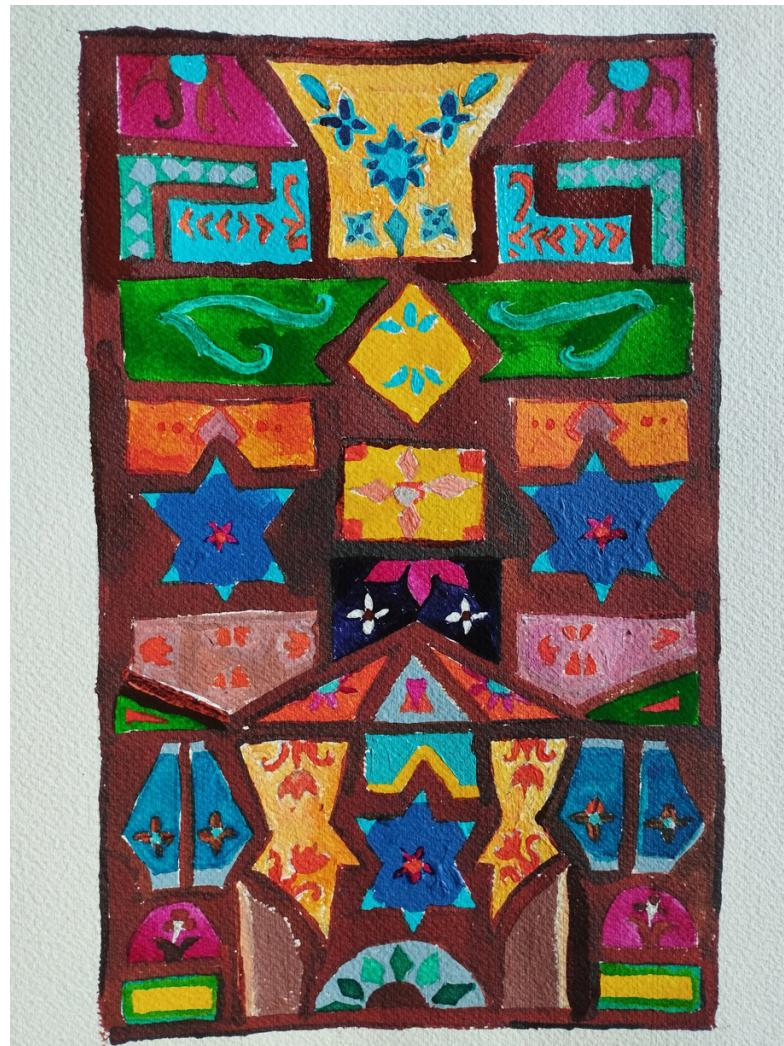
*Acrylics
2011*

Tribal



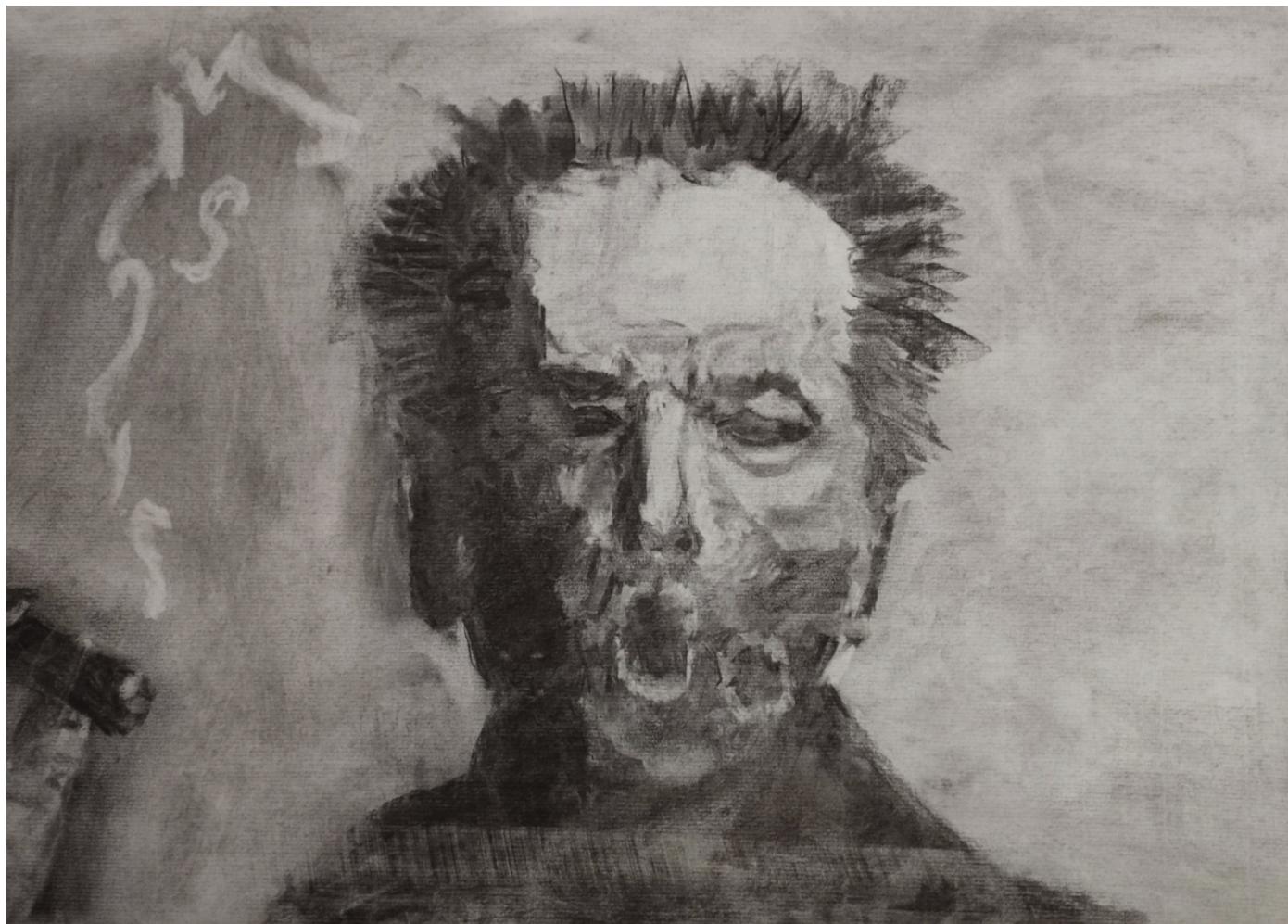
*Inks and acrylics
2024*

Tribal



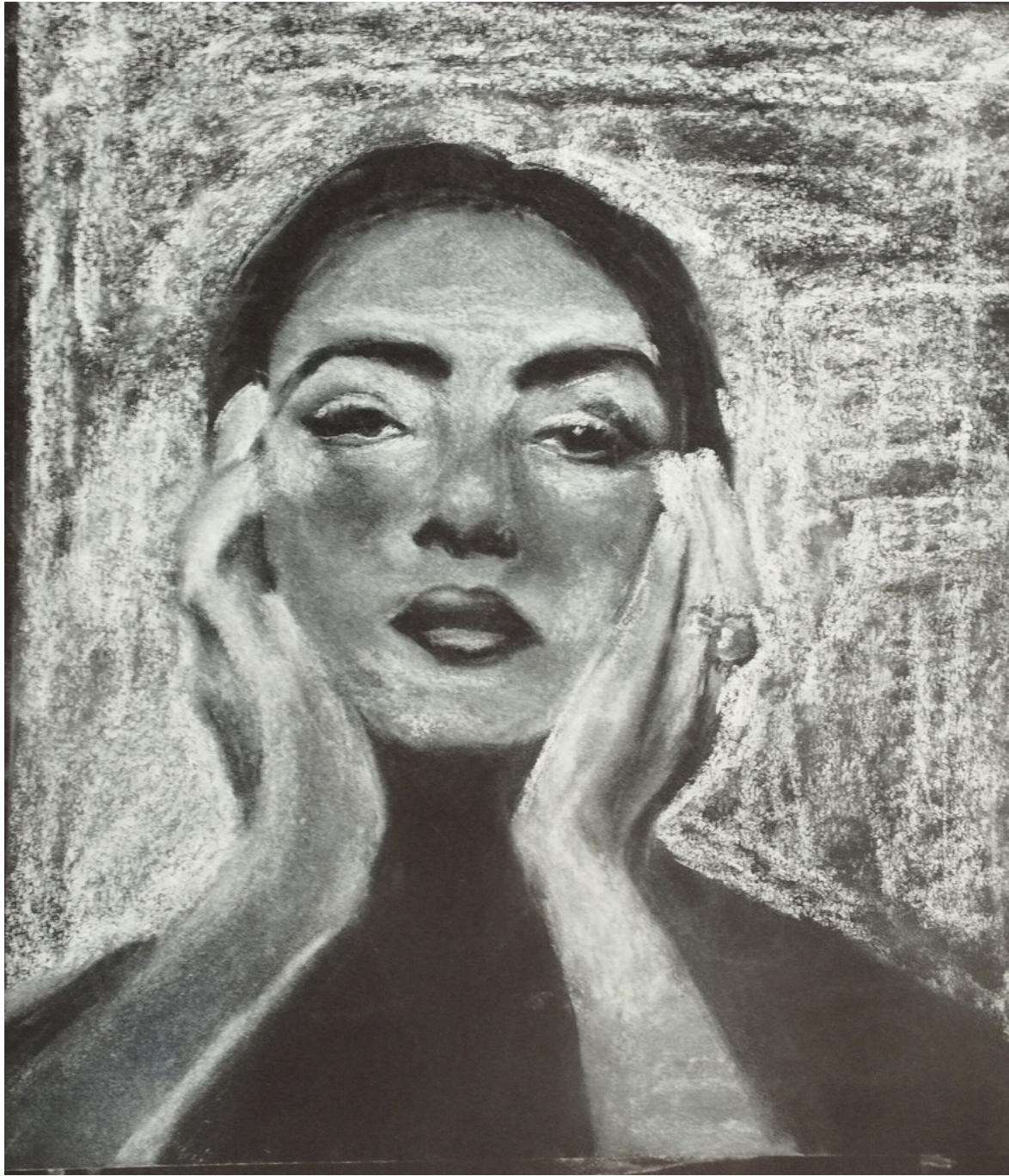
*Inks and acrylics
2024*

Smoking



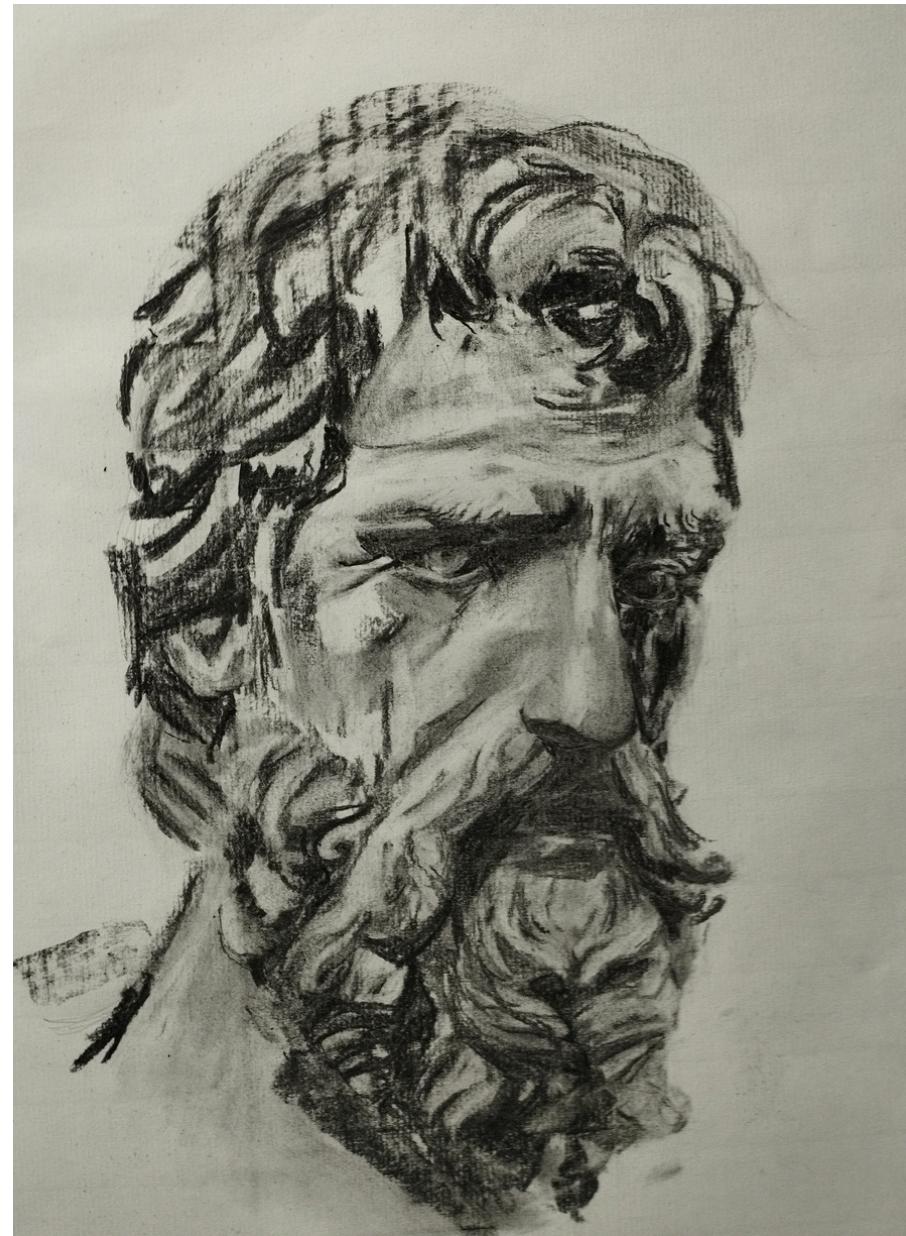
50*32

Charcoal portrait
2023



chalk portraits
50*65
2023

Sad man



Charcoal on paper

(35 * 60)

2024

Sari



*Sari on blue acrylic with brown ink
2011*



Oil on paper
(35 * 60)
2024

A village in Franche-Comté
(Village for sale: 2M)



50*32
Pencil
2023



pen on paper

(35 * 60)

2025

Sketch

self-portrait pregnancy sketch



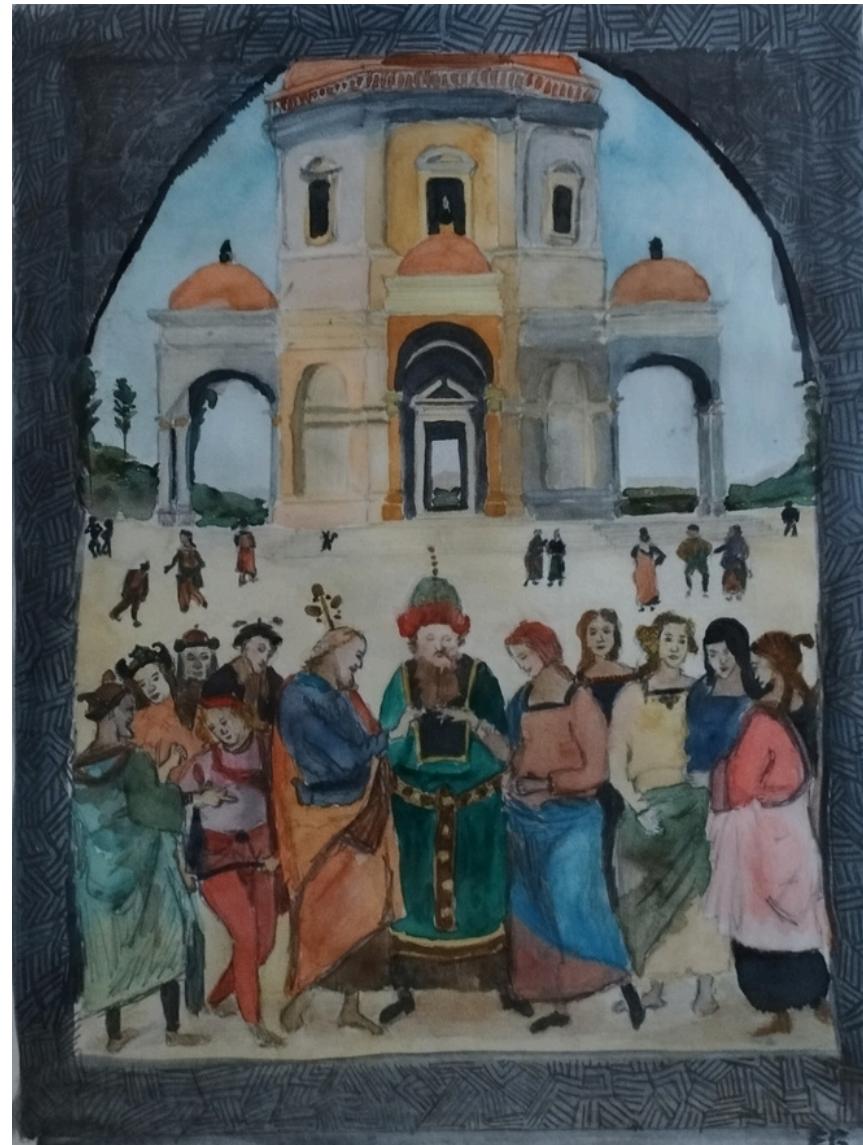
*pen on paper
2025*

little dancer sketch



*pen on paper
2025*

The Virgin wedding



50*30 - 2023
watercolours
according to a model of
Raffaello Sanzio (Revisited version)

Swing



*Oil and Kraft paper on paper
(35 * 60)
2025*

Nonsensical periodic chessboard



50*70
Acrylics, inks
2022

pottery

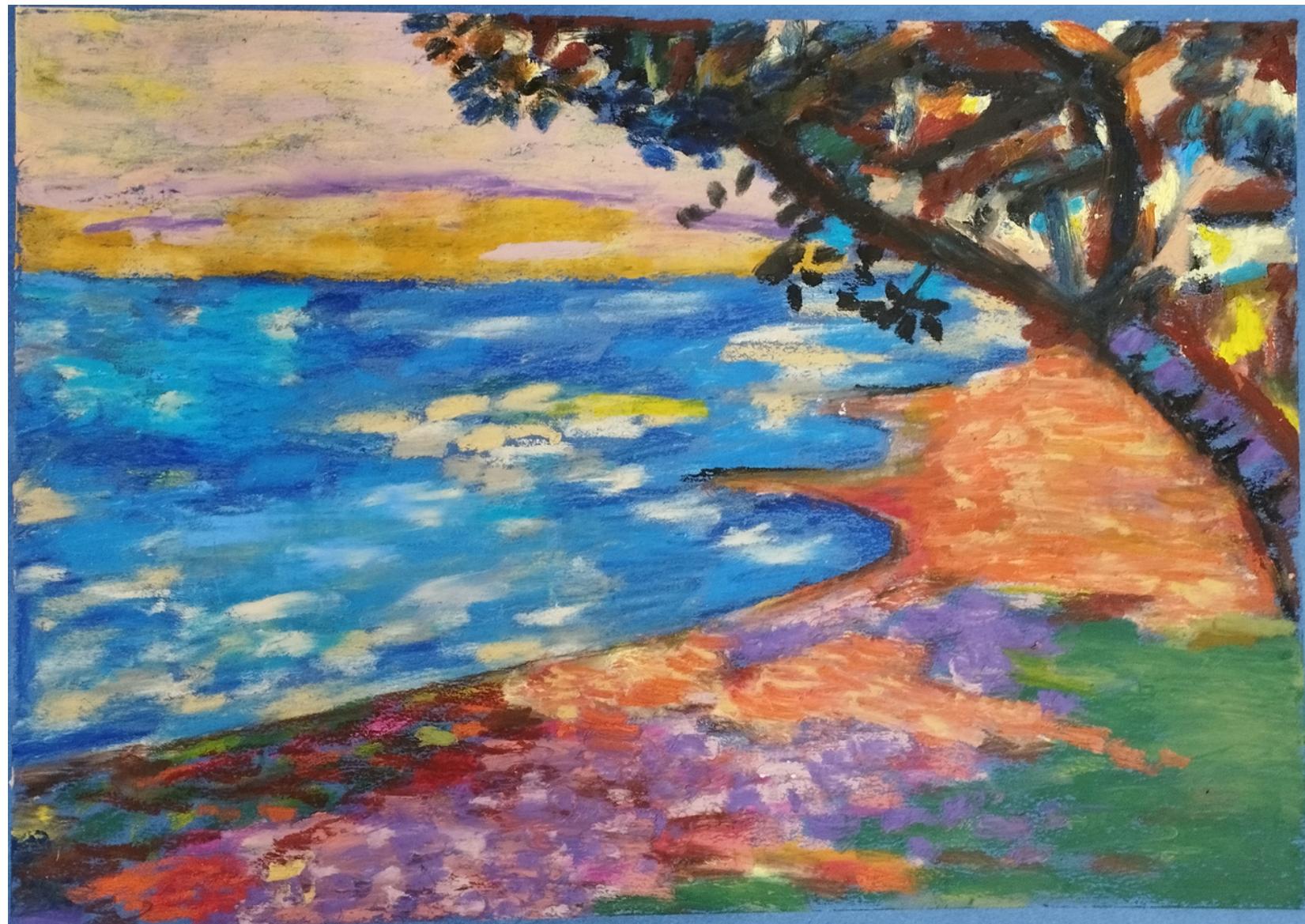


pottery





Mosaics, acrylic and table collages
2022



50*65
Oil pastels
2023

Still life in shades of gray



Brown, blue and white acrylics
2023



50*32

Watercolours
2023

According to a model of Egon Schiele (Revisited version)



Acrylics
2023

According to models of David Hockney (Revisited versions)

50*65

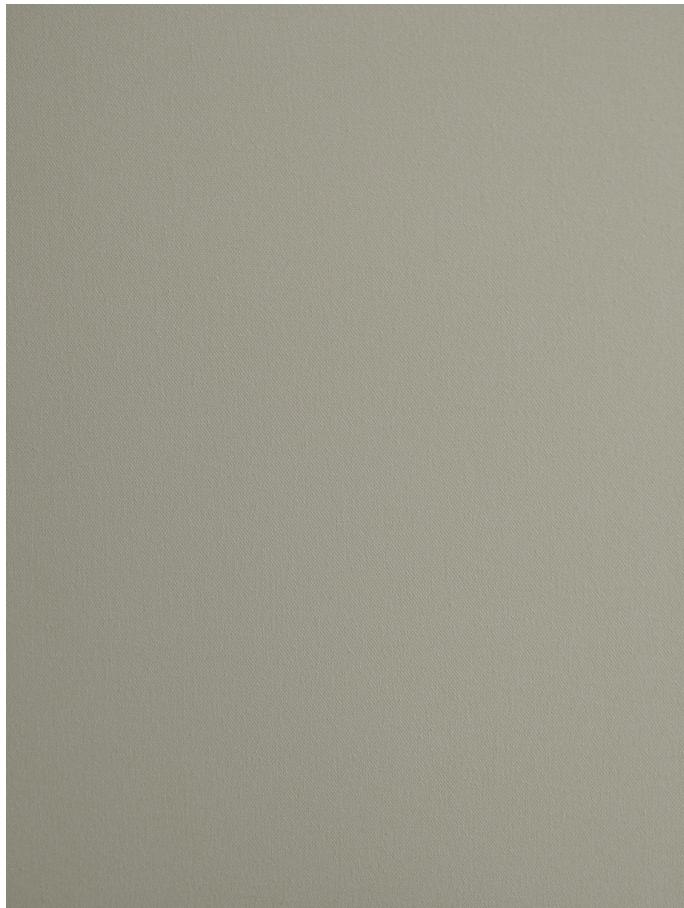


65*50
Knife acrylics
2024

According to a model of Mher Chatinyan (Revisited version)



Undated (<2010)



*The next drawing to appear...
Empty Canvas*