

**Full-proposal, CSG projects, November 2005**

Project Title:

**IMAGINING GENOMICS: INTRODUCING VISUALITY IN THE GENOMICS DEBATE**

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**1. Project manager(s)**

*a. Principal applicant / contact:*

Name, title(s):

Prof. dr. Robert Zwijnenberg

University:

Universiteit Maastricht

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*1 b. Composition of the research group (e.g. these are researchers who are actively engaged in the research project): Indicate for each of these their role and contribution to the project:*

Name and title:	Organisation	Role/responsibility:
<b>Prof. dr. Robert Zwijnenberg</b> Interaction of Art and Science	Universiteit Maastricht / Universiteit Leiden, director of The Arts and Genomics Centre	Project leader
<b>Dr. Cor van der Weele</b> Philosophy of Biology	Wageningen University	Postdoc 1
<b>Dr. Helen Chandler</b> Human Population Genetics/ Biological Anthropology	Scientific manager for The Arts & Genomics Centre	Postdoc 2

*1 c. Composition of the supervisory board (e.g. researchers and/or others monitoring the progress and development of the project):*

Name and title:	Organisation	Role/responsibility:
<b>Prof.dr. H.J.M. de Groot</b> Biophysical organic chemistry	Faculty of Sciences, Universiteit Leiden, technology coordinator Centre for Medical Systems Biology	Expert team
<b>Dr. Jill Scott</b> Media Art, Media Philosophy, Artist in lab collaborations	Artists in Swiss Science Labs, Institute of Cultural Studies in Art, Media and Design, University of Applied Sciences and Arts Zurich, Switzerland	Expert team
<b>Dr. Ken Arnold</b> Head of Public Programmes at the Wellcome Trust	Wellcome Trust, UK	Expert team
<b>Dr. M. van Rijsingen</b> Bio Art	Department of Art History, University of Amsterdam	Expert team
<b>Prof. Dr. M. J.J.Korthals</b> Applied Philosophy	Wageningen University	Expert team
<b>Ir. D.G. Houtgraaf</b> associate director public & production services	Naturalis, National Museum of Natural History	Expert team
<b>Oron Catts</b> Artistic Director	SymbioticA, The Art and Science Collaborative Research Laboratory School of Anatomy and Human Biology, University of Western Australia, Perth, Australia	Expert team

*1 d. Proposed candidate (Post-doc only – e.g. CSG funding is eligible only to post-docs who do not have a permanent position at a university or research institute):*

Post doc project 1:

Name: **Dr. Cor van der Weele**

Affiliation: Applied Philosophy (Department of Social Sciences), Wageningen University

Background: Molecular genetics / philosophy of biology / ethics

Title PhD thesis: Weele, C. van der 1995. *Images of Development. Environmental causes in ontogeny*. Amsterdam, VU, and Albany, SUNY Press 1999.

Post doc project 2:

Name: **Dr. Helen Chandler**

Affiliation: Scientific Manager for The Arts & Genomics Centre

Background: Human Population Genetics/ Biological Anthropology

Title PhD thesis: Chandler, H.C. 2003. *Using Ancient DNA to Link Culture and Biology in Human Populations*. University of Oxford, Oxford. D. Phil.

2 a. Top 3 scientific publications of the Project Leader (as mentioned in 1a) of the proposed research:

1. Zwijnenberg, R. (1999). *The Writings and Drawings of Leonardo da Vinci. Order and Chaos in Early Modern Thought*. Cambridge University Press.
2. Farago, Claire and Robert Zwijnenberg, edited and introduction. (2003). *Compelling Visuality: the work of art in and out of History*. University of Minnesota Press
3. Egmond, Florike & Robert Zwijnenberg, edited and introduction. (2003). *Bodily Extremities*. Ashgate Press.

2 b. Top 5 scientific publications of the Project Team (as mentioned in 1b) of the proposed research project:

1. Van der Weele, C. 2005. Images of the genome: From public debates to biology, and back, and forth. In: T.Reydon and L Hemerik (eds): *Current Themes in Theoretical Biology*. Dordrecht: Springer; 9-32
2. Van der Weele, C. 2005. Monsters omarmen in grensgebieden en achterkamers: Genomics en veranderende relaties tussen wetenschap, filosofie en kunst. In: *Filosofie en Praktijk* 26-1; 38-49
3. Chandler, H.C. 2003. *Using Ancient DNA to Link Culture and Biology in Human Populations*. University of Oxford, Oxford. D. Phil
4. Van der Weele, C. 1999. *Images of Development. Environmental causes in ontogeny*. Albany, SUNY Press (originally Amsterdam, VU 1995)
5. Van der Weele, C. 2001. Developmental Systems Theory and Ethics: Different ways to be normative with regard to science. In: Oyama. S et al (eds): *Cycles of Contingency; Developmental Systems and Evolution*. Cambridge: Bradford/MIT.

2 c. Please list a maximum of 5 societal publications – e.g. newspapers, popular science writing etc. - of the applicants of the proposed research:

- 1) Zwijnenberg, R. 2002. Wetenschapsjournalist én Kunstcriticus. Over de noodzaak van kunstkritiek door wetenschapsjournalisten. In Rianne Lindhout en Jaap Willems (red.), *Wetenschapsjournalistiek. Is de optiek van wetenschapsjournalistiek te beperkt?* (pp. 60-69). Amsterdam: VU.
- 2) Van der Weele, C. 2004. *Hoe vreemd is de Beemster. Vanzelfsprekendheden en de toekomst van water in Nederland*. Den Haag, LEI
- 3) Beekman, V. en C. van der Weele 2004. *Naar een gereedheidskist voor constructieve ethiek*. Den Haag, LEI
- 4) Christiansen, J., Hall, R. Chandler, H. et al. (Eds.) 2005. *Nature for Sale: The Impacts of Privatizing Water and Biodiversity*. Amsterdam, Friends of the Earth International
- 5) Chandler, H. 2001. Specialist advisor on ancient DNA for Icon Films production “The Hunt for the Wildman”. Screened on the Discovery Channel and Channel 4 (UK). World-wide distribution.

### **3. Detailed description of the proposed research project**

#### *3 a. Introduction:*

Ethicists have increasingly been turning to literature, because it contains richer, “thicker”, suggestions than ethical theory of what living a good life could be like. More generally, “imagination” is now seen as an important source of moral exploration, especially in connection with technologies, such as genomics, that have powerful and unprecedented potential for changing the world and ourselves. There are indeed good reasons to turn to the imagination for moral help. One such good reason is that ethical debate by itself often tends to get “stuck”: moral problems are often framed in terms of traditional conceptual dualisms (such as the natural versus the artificial), which do not suffice to articulate present day realities and intuitions. Dualistic problem framing encourages dichotomic ways of framing policy options, for example in terms of yes or no (cf. Weston 2001).

“Imagination” is a word that suggests visuality. So far, however, the imaginative help that ethicists have sought has predominantly involved linguistic forms of imagination: literature, science fiction, and scenario-aspects of film. Yet predominantly visual forms of imagination are also abundantly available. For about 15 years now, visual artists have increasingly been engaged with biology in general and genomics in particular (Anker & Nelkin 2004). In this project, we propose to explore in a systematic way the potential of visual art to contribute to the quality and richness of moral debates. The project will not be confined to ethics in academic contexts, on the contrary: we will explicitly include and even give priority to public moral debate

#### *3 b. Detailed description of the **problem statement and objectives:***

Moral debates have an important characteristic: being debates, they are linguistic phenomena. Exploring the potential of visual art with regard to morality therefore necessarily implies attention to relations between the visual and the linguistic, or between words and images. Therefore, in looking for answers to the core question of the project, whether and how visual art can enhance the quality of moral debates on genomics, differences, commonalities and interactions between (artistic) images and words are a central topic. The project will build on insights from literature on this topic which are relevant for our object of study: the border area of genomic art and moral debate. In this border area, many experiments are going on that challenge traditional boundaries of science, art, philosophy and education. In order to contribute to an understanding of these experiments, the project will study existing examples but it will also set up its own experiment. To that end, a genomic art work with interactive potential will be developed by an artist-in-lab. The artwork will be exhibited in the natural science museum *Naturalis* (Leiden). During the exhibition, interaction between the work of art and the public will be studied. Word-image relations are the central focus throughout the project. The general objective of the project is to contribute to a better understanding of interactions between science, art and philosophy through a focus of word/image relations. The specific objective is to gain a better insight in relations between artistic images and

moral debates and, on the basis of these insights, to suggest ways in which art can have constructive roles in these debates.

*3 c. Detailed description of the **theoretical** framework:*

It is not accidental that visual forms and aspects of imagination, including “imagery”, have met with relative neglect by ethicists so far. The neglect can be ascribed to the continuing effects of the linguistic turn in philosophy, with the later Wittgenstein’s scepticism about the cognitive role of images as a central influence. Although philosophers are slowly becoming interested in images and imagery again, many discussions of imagination are still shaped by the thorough rejection of imagery. Even philosophers explicitly interested in “moral imagination”, such as Mark Johnson (1993), tend to approach imagination in a linguistic way, focussing on narrative and on linguistic sides of metaphor.

At the same time, the study of relations between words and images is an ever expanding area of research within disciplines such as history and philosophy of art, cultural studies and cognitive psychology. Studying the role of images in moral debates on genomics should build on insights from these disciplines. The project will use various leads. One promising lead is an approach in cognitive psychology called “dual coding theory” (e.g. Paivio 1986, Sadoski and Paivio 2002), which explicitly addresses relations between words and images. According to the dual coding approach, cognition consists of two separate, but interacting, coding systems, one sequential system specialised for language and one non-sequential system dealing with imagery. The theory has been influential because it is able to explain a diversity of empirical phenomena, for example, the important role of the interaction of words and imagery in memory. Educational implications include the use of concreteness to enhance comprehension; according to the theory, concrete language connects verbal representation with nonverbal images.

A lead for understanding the role of artistic imagery in moral debates can also be found in studies on early modern anatomical images. Since the Renaissance, it has proven to be impossible to develop and disseminate comprehensible anatomical knowledge without the help of anatomical drawings, which are an active force in the formation of new knowledge (cf. Zwijnenberg 1999, Ch. 6).

Further help in understanding the role of imagery in moral debate can be found in theories of art in which an artwork is considered as a locus of contradictions, in which opposites can coincide (Farago & Zwijnenberg 2003: 112-132). Georges Didi-Huberman (1995) has argued persuasively how within the field of possibilities opened up by the visual register, such as inconsistencies, paradoxes, ambiguities or uncertainties, an artist can try out different and sometimes opposing avenues for understanding a theological mystery in one work of art. In general, modern art theory discusses art’s possibility to represent the unrepresentable, the unpicturable, the ineffable, the inconceivable, and the unseeable (cf. Elkins, 1998). Barbara Stafford (1991) has made a strong case for an enhanced recognition of the cognitive importance of images.

A conjecture in this project is that (changing) relations between words and images are associated with (changing) relations between science, art, philosophy and education.

Relations between these fields are centrally at issue in genomic art. In this project, the establishment of a border area between them plays a large role. Theoretical leads from Science and Technology Studies, notably on boundary work and boundary concepts, will be used in our attempt to set up a border area that enables new interactions between words and images as well as between arts, genomics, philosophy and education.

### *3 d. Research Questions:*

The first and more general hypothesis of the project is that changing boundaries between traditional fields (art, science, philosophy, education) are associated with changing relations between words and images. The second and more specific hypothesis is that artistic imagery can contribute to the quality of public moral debate on genomics. We will use the theoretical leads mentioned above to sharpen these guiding hypotheses. The second hypothesis can already be described in some more detail. Artistic visual imagery, because of its non-sequential and holistic character, is capable of combining within one whole elements which, in verbal treatments, are wide apart or even opposed. Thereby, artistic imagery is able to ignore the principle of the excluded middle and to bypass or overcome dualisms that are so dominant in ethical debates and that tend to be reinforced by words, for example naturalness and artificiality, passivity and activity, autonomy and dependence. Transgenic artist Eduardo Kac, for instance, argues that, with his works of art that place the question of the actual creation of life at the centre of the debate (such as his GFP Bunny), he is not attempting to moderate, undermine or arbitrate the public discussion. Rather he seeks to contribute a new perspective that offers ambiguity and subtlety where we usually only find affirmative and negative polarity (Kac 2003). In this sense, he argues, bio-art can be considered as a form of social intervention that uses visual imagery and imagination instead of words.

Guided by our hypotheses, we will study interactions between science and art and between artistic images and moral debate. With regard to moral debates we will pay special attention to situations of “stuckness”, such as persistent dualisms and paradoxes. We intend to expand our understanding of whether and how interactions between words and images can function to dissolve such impasses.

### *3 e. Detailed description of the methodology:*

The project involves seven phases. In most steps different members of the research team will collaborate. There will also be constant collaboration with the laboratory and the museum involved in the project, and regular contact with the members of the expert team. The outcome of the different phases is heterogeneous. The postdocs will produce articles in peer-reviewed journals.

1. Literature study across various disciplines, along the lines indicated under 3c, in search for relevant insights on a. relations between words and images and b. how relations between words and images are associated with relations between fields (postdoc project 1).

2. Study of best-practices examples from ecological art in which interaction between verbal analysis and artistic representation has been innovative. Explanation: we are interested in the specific border areas in which traditional cognitive tasks of science, philosophy, art and education are mixed up and redefined. A field in which such new border spaces have been showing up for some time is ecological art, which has given rise to new, hard to characterise activities such as “performative science” and in the process has been developing new forms of public discussion and education. We will use ecological art projects as a guide in our search for innovative interactions between genomics, art, and ethics (postdoc project 2). For example, the work of environmental artist Brandon Ballengée bridges the gap between research biology and art. Ballengée is involved directly with field research and uses the visual impact of science to engage the public in a discussion of broader environmental issues.
3. Study of interactions in existing (completed) genomic art projects through interviews with scientists and artists involved (postdoc project 2). Since postdoc 2 is the scientific manager of the Arts and Genomics Centre, she can benefit from the centre’s expertise on bioart through its participation in the NWO research programme *New Representational Spaces*, of which Prof. Zwijnenberg is the project leader. The centre's network also includes access to practising bio-artists to act as case studies for the research.
4. Development of a work of art in a laboratory (postdoc 2 and artist, in close collaboration with Prof. Dr. De Groot, Leiden). In this phase, the project will give actual shape to border spaces between science, art and moral debate. The project therefore incorporates an artist-in-residence project. Building on insights from STS on boundary work and other insights from the theoretical exploration, the project intends to define and create a border space in the form of an artist-in-lab scheme. This artist-in-lab scheme functions as an empirical experiment. Though moral debate is not a central issue in this phase, since the centrally involved fields are science and art, relations between words and images will receive special attention in this phase as well.
5. Exposition of the art work in museum *Naturalis* The exhibition should include an element of interactive process. The Museum and the Arts and Genomics Centre will cooperate in the coordination of this phase, including the organisation of accompanying seminars and public interaction aspects of the project such as documentation. (see question 4 for a detailed description).
6. Study and analysis of the interactive parts of the artwork in the museum (postdoc projects 1 and 2, curator, artist). From April until October 2006, *Naturalis* will organise the project *Conversations* (working title). *Conversations* is basically a series of conversations between scientists and artists in response to the scientific collection of the museum. The aim of this experimental project is not the creation of art works as such but to analyse and to learn from the ‘language’ used or created by artists in their response to and interpretation of science and scientific practices. The hypothesis is that this ‘language’ (visual, verbal or auditory) will give to the public a new device for understanding science. Thus, *Naturalis* sets

out to employ this ‘language’ in the new exhibition practice of the museum from 2007 onwards. The project will be executed in close collaboration with the Natural History Museum of Los Angeles County; it will be evaluated and discussed by Steve Seidel, the Director of the Arts in Education program at the Harvard Graduate School of Education. Seidel believes strongly in the role arts can play in science education. This phase of the research proposal is clearly an element in the new exhibition and public understanding of science strategy of *Naturalis*, in which art plays an important role. The study and analysis of the interactive parts of the artwork in the museum and the development of proposals for a systematic use of artistic images in moral debates will draw upon the results of *Conversations* and will be carried out in close collaboration with the experts from *Naturalis*.

7. Developing proposals for a systematic use of artistic images in moral debates in order to enhance their quality (postdoc projects 1 and 2).

*3.f. How does the 25% **societal interaction** that CSG requires from each of the projects help shape the answers to the research questions? (e.g. societal interaction is not similar to dissemination but includes the **exchange** of knowledge, data and information).*

At the core of the project lies an artist-in-residence project and an accompanying public exhibition. This residency, an experiment informed by the theoretical background provided by the postdoc projects, will involve the participation of public and private groups and individuals. These include:

an artist, selected under criteria determined by the results of the case study analysis; a genomics research laboratory (under Prof. Dr. Huub de Groot, Leiden University) within which the artist will work collaboratively with the researchers; the Naturalis Museum in Leiden at which the artist and lab will exhibit their work as an ongoing part of the collaborative process; the curator of the open laboratory and exhibition; the public visitors to the exhibition; and naturally the researchers in the postdoc projects.

An artist will thus be selected to collaborate with scientists in a genomics research laboratory; an important condition will be that the artist will produce work as a result of that collaborative experience.

The exhibition space, hosted by Naturalis, is a crucial feature of the study. This becomes the space where the science/scientists and the public can interact, mediated both by the artist (and his/her art produced in the lab), and by the museum curator who will assist in its presentation. It is also very importantly the space where the project researchers can observe the outcomes of the collaboration and monitor the actual processes involved in the information flow between genomics researchers/artist and the public and back again to the researchers.

The exhibition will coincide with the later part of the residency, so that the artist will receive feedback from the reception of the exhibited work, which will be brought back into the laboratory for further analysis and comment, by both the artist and the surrounding genomics researchers. In addition, the exhibition itself becomes a site of public interaction, through the presence of the artist and participating scientists at events surrounding the exhibition. Thus in the project there is an emphasis on back and forth movement between theory and practice and between science/art and public.

While the form of the artwork produced by the artist in the laboratory cannot be predicted in advance, it is likely to require equipment and materials only available in the lab in order to be exhibited. This is anticipated to require that a laboratory or some part of a laboratory will be set up in the exhibition space. A precedent for such an exhibition requirement is found in the works of the Tissue Culture & Art group, whose semi-living works require a functioning bioreactor to be installed in the host gallery (Catts and Zurr 2002). Aspects of the functioning laboratory are thus brought directly into the public sphere, with an accompanying explanation and context provided jointly by the scientist, artist and curator.

The exhibition thus becomes a re-enactment of the collaboration which occurred in the lab, but in a setting which allows for scrutiny of the collaboration by outsiders to occur. In addition, this setting allows for scrutiny and analysis of the exchanges between the public and the scientists and artist.

To accompany the exhibition, educational materials will be developed in cooperation with Naturalis. In addition, students of the Life Science and Technology course run jointly between Delft and Leiden universities will be involved in the project and exhibition.

### *3 g. How does the project fit in with CSG's research agenda?*

The project in the first instance investigates the use of the visual arts in widening the terms of discussion on the ethical and social implications of genomics research, addressing directly one of the centre's main aims.

Secondly, the project promotes collaboration - between genomics researchers, social sciences/philosophy researchers, artists and the public - generating a new public space for the discussion of and interaction with genomics research. The discussion is given a physical location in the exhibition space at Leiden's Natural History Museum Naturalis. By making a genomics lab and its researchers partners in the venture as hosts of the artist, the project seeks to stay close to actual researchers and current research. In utilising a popular public exhibition space, the project's results will reach a wide general audience. On the basis of the results of both the theoretical and practical aspects of the project, we will seek to develop a set of practical guidelines for setting up interactions between the arts and genomics and the public. These guidelines will concentrate on new methods of opening up moral debate, with central emphasis on the role of artistic imagery.

*3 h. What is the **international component** of the research? (Please indicate what are existing and what are the planned cooperations. What is the role of co-operations in this research project).*

Art/science collaborations are a relatively new phenomenon in The Netherlands, with only a few precedents, some of which will be used as case studies for the postdoc project 2 (e.g. de Menezes 2003). The project thus relies in part on cooperation with international organisations already involved with setting up these collaborations. In particular, through The Arts & Genomics Centre, members of the research team already have contacts with Prof. Dr. Jill Scott of the Artists in Swiss Science Labs project (Scott 2006) and with Dr. Ken Arnold, head of public programmes at The Wellcome Trust and former head of exhibitions there. We will seek advice from these overseas experts on the setting up of such a project. Also the art-science collaborations already conducted by them will be used as case studies for the postdoc research projects. The close ties already existing through The Arts & Genomics Centre allow ready access to both the artists and scientists who participated in those collaborative projects.

Further, The Arts & Genomics Centre has formed ties with the group SymbioticA at the University of Western Australia, hosts of the Tissue Culture & Art group which will enable information particularly about the exhibition of living materials to be passed onto our researchers. The proposed educational material to accompany the exhibition will be shared with Symbiotica's postgraduate degree programme, Master of Science (in Biological Arts), run at the Faculty of Life and Physical Sciences, University of Western Australia.

It should also be noted that the artist selected for the residency may be an overseas artist.

*3 i. Time-table:*

Phase 1: April 2006 – April 2007  
Literature study

Phase 2: April 2006 – August 2007  
Study of best-practices examples

Phase 3: April 2006 – January 2007  
Study of interactions in existing (completed) genomic art projects

Phase 4: October 2006 – January 2008  
Development of a work of art in a laboratory

Phase 5: January 2008 – July 2009  
Exposition of the art work in museum Naturalis

Phase 6: January 2008 – Jan 2009  
Study and analysis of the interactive parts of the artwork in the museum

Phase 7: January 2009 – April 2009  
Developing proposals for a systematic use of artistic images in moral debates

The complexity of the project, and the number of people and institutions involved (researchers, artist, curator, laboratory, museum), does not allow for an evenly spread work load of the postdocs over the course of three years. The average input of both post docs will be 0,3 fte for three years.

*3 j. References (as mentioned in the text):*

Anker, Suzanne & Dorothy Nelkin. (2004). *The Molecular Gaze: Art in the Genetic Age*. Cold Spring Harbor Laboratory Press.

Catts, Oron and Ionat Zurr, (2002) Growing Semi-Living Sculptures: The Tissue Culture & Art Project. *LEONARDO*, Vol. 35, No 4, pp. 365-370

Didi-Huberman, Georges (1995). *Fra Angelico. Dissemblance and Figuration*, translated by Jane Marie Todd. Chicago and London: The University of Chicago Press.

Egmond, Florike & Robert Zwijnenberg, edited and introduction. (2003). *Bodily Extremities*. Ashgate Press.

Elkins, James (1998). *On Pictures, and Words that Fail them*. Cambridge University Press.

Elkins, James (1999). *Pictures of the Body. Pain and Metamorphosis*. Stanford University Press.

- Farago, Claire and Robert Zwijnenberg, edited and introduction. (2003) *Compelling Visuality: the work of art in and out of History.*, University of Minnesota Press.
- Johnson, M. 1993. *Moral Imagination. Implications of cognitive science for ethics.* Chicago, University of Chicago Press.
- Kac, Eduardo. (2003). GFP Bunny. *LEONARDO*, Vol. 36, No. 2, pp. 97–102.
- Menezes, Marta de. (2003) The Artificial Natural: Manipulating Butterfly Wing Patterns for Artistic Purposes. *LEONARDO*, Vol. 36, No 1, pp. 29-32
- Paivio, A. 1986. *Mental representation: a dual coding approach.* New York, Oxford U.P.
- Plautz, Dana. (2005) New Ideas Emerge When Collaboration Occurs. *LEONARDO*, Vol. 38, No 4, pp. 302-9
- Sadoski, M. and A. Paivio, 2001. *Imagery and Text. A Dual Coding Theory of Reading and Writing.* London, Lawrence Erlbaum
- Schlick, Tamar. (2005) The Critical Collaboration Between Art and Science: An Experiment on a Bird in the Air Pump and the Ramifications of Genomics for Society. *LEONARDO*, Vol. 38, No 4, pp. 323-9
- Scott, Jill (Ed.), (2006) *Artists-in-labs. Processes of Inquiry.* HGKZ Zürich. Springer Verlag Wien, forthcoming.
- Shanken, Edward A., (2005) Artists in Industry and the Academy: Collaborative Research, Interdisciplinary Scholarship and the Creation and Interpretation of Hybrid Forms. *LEONARDO*, Vol. 38, No 5, pp. 415-8
- Stafford, Barbara (1991). *Body Criticism. Imaging the Unseen in Enlightenment Art and Medicine.* MIT. Cambridge.
- Weston, A. 2001. *A 21<sup>st</sup> century ethical toolbox.* New York, Oxford UP.
- Zwijnenberg, Robert. (1999). *The Writings and Drawings of Leonardo da Vinci. Order and Chaos in Early Modern Thought.* Cambridge University Press.

**4. Results: what are the products that will be generated within this project (please indicate both academic output and societal output)?**

Products generated by this product will include:

Academic publications in the fields of ethics and philosophy (of art and science), and in art theory.

An artwork or works.

An exhibition at Naturalis museum – including reconstruction of a lab.

Lectures/presentations/artist's statements where artist and scientists explain their role in the project, their understanding and experience of the process and their understanding and appreciation of the product/s.

Educational material for Life Science and Technology students at Leiden/Delft. universities and also for use at Symbiotica at the University of Western Australia.

Educational materials to accompany the exhibition.

Public tours of the lab which produced the work.

Documentation of the collaborative process, including interviews with the participants, in the form of a DVD and written documentation e.g. the artist's or scientist's journal.

An exhibition catalogue.

Exposure of the general public to a working genomics lab.

Exposure of the public to ethical issues in a new visual way.

Formulation of a set of principles by which art/the visual can play a constructive role in the ethical debate surrounding genomics.

**5a. Requested budget (amounts in Euro)<sup>i</sup>**

	2006	2007	2008	2009	Subtotal
<b>Personnel</b>					
Post-doc 1	12750	17000	17000	4250	51000
Post-doc 2	12750	17000	17000	4250	51000
Artist		20000			20000
<b>Material</b>					
Travel	1250	1667	1667	416	5000
Conferences					
Other					
<b>Interaction and Education</b>					
Workshops, meetings Focus groups			8250	8250	16500
Publications/publicity					
Artist in lab project		5500	5500	5500	16500
<b>TOTAL</b>					<b>160000</b>

Please indicate the total number of Fte's<sup>ii</sup>:

	2006	2007	2008	2009	Total Fte's
<b>Personnel</b>					
Post-doc 1	0,225	0,3	0,3	0.075	0.9
Post-doc 2	0,225	0,3	0.3	0.075	0.9
Senior researcher (project leader)	p.m.	p.m.	p.m.	p.m.	p.m.

**5 b. Explanation and/or remarks to the proposed budget**

**5 c. Financial assistance from (an)other resource(s)**

If necessary co-funding for the artist and his/her residency will be applied for at Dutch Art funds (Mondriaan Stichting).

<sup>i</sup> CSG funding is applicable only to post-docs who do not have a permanent position at universities or research institutes.

CSG allows senior researchers to (financially) participate in the project for a maximum of 0,2 fte (maximum of 0,4 fte in total for the whole duration of the project).