

## ERC Starting Grant 2015 Research proposal [Part B2]

### Section a. State-of-the-art and objectives

#### **Context**

Every single human is the product of a pregnancy, usually a nine-month period of development within another human's body. But pregnancy itself has not been a traditional focus in philosophy. That is remarkable. First, because pregnancy poses tantalising philosophical questions: it is uncontroversial that there is only one organism before a pregnancy, whereas after a pregnancy, there are (usually) at least two. But when does one organism become two? What, during the pregnancy, is the relationship between foetus and its gestating organism? And what, if any, are the entities that persist though conception, pregnancy and birth? Second, because so many topics that seem to depend on those questions have taken centre stage in philosophical enquiry. Examples include questions about personhood, personal identity and personal persistence; the boundaries of the self and the relationship between self and body; coming into existence; and topics in reproductive ethics, such as rights over and obligations towards foetuses and/or (future) offspring.

This project launches the metaphysics of pregnancy as an important and fundamental area of philosophical research. It proceeds from a triple conviction. First, that pregnancy is philosophically fascinating in its own right. Second, that a proper understanding of pregnancy is essential for and should be prior to a range of other philosophical and practical questions. Third, that our understanding of pregnancy would benefit from sustained philosophical attention at a fundamental level, in close dialogue with our best empirical understanding of the life sciences – most notably physiology.

#### **Aims**

The core aims of the large project are:

- (1) to develop a philosophically sophisticated account of human pregnancy and birth, and the entities involved in this, that is attentive to our best scientific understanding of human reproductive biology;
- (2) to articulate a metaphysics of organisms, persons and selves that acknowledges the details of how we come into existence; and
- (3) to start the process of rewriting the legal, social and moral language we use to classify ourselves and our actions, so that it is compatible with and accommodates the nature of pregnancy and birth.

#### ***State-of-the-Art: the Foetal Container Model***

In mainstream philosophy, pregnancy commonly appears in at least three main contexts. A brief survey of those serves to illustrate that the dominant conception of pregnancy is what I shall call the *foetal container model*.

A first context where pregnancy is discussed is that of the non-identity problem: the question whether future individuals can be harmed or wronged by the consequences of choices or conditions that were necessary to their existence (Parfit, 1984). In this context, the nature of pregnancy is not seen as very relevant; whilst the original formulation of the problem involved a pregnancy (Parfit, 1984), it is seen as a general problem about the creation of not-yet-existing people or *future generations* (e.g. Kavka, 1981). Many of the same questions would arise if humans conceived and developed not in other humans, but in (sometimes imperfect) artificial womb-incubators.

Second, pregnancy is the stage for philosophy's considerable literature on the morality of abortion. Here the metaphysical focus tends to be not on the peculiar nature of pregnancy – the intimate relation between foetus and maternal<sup>1</sup> organism – but on the foetus alone: its properties, development, 'moral status' and rights. At best, the maternal organism appears in this literature as a human container or life-support machine for the foetus: one of the most prominent defences of abortion, for example, employs that latter analogy (Thompson, 1971). At worst, the gestational context of foetal development, and/or the humanity of its gestator, is forgotten altogether (Purdy, 1990).

Third, pregnancy makes an appearance in the context of various other questions about reproduction and morality, such as reproductive choices (e.g. prenatal screening & embryo-selection; e.g. Buchanan et al, 2000); the obligations of pregnant women towards their foetus or future offspring (e.g. Savulescu 2007); and

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<sup>1</sup> Although the vast majority of human pregnancies happen in women, not all pregnant people identify as such. At the same time, not all pregnant women intend to mother their offspring, nor were all mothers were once pregnant. Nevertheless I have decided to stick mostly with 'maternal organisms', and 'women'. Not only because exclusively speaking of 'gestators' may further undermine the humanity, subjectivity and agency of pregnant women, but also because preserving the (imperfect) connection between gestation and gender may be important for understanding aspects of its academic treatment, such as the historical lack of philosophical interest in this topic.

questions in *obstetric ethics*: how obstetricians and other health care professionals should act in the context of sometimes conflicting needs of maternal and foetal patients (e.g. Chervernak & McCullough, 1996). Some of these questions reduce to the non-identity problem (Lillehammer, 2005) and would not be substantially different if we developed in artificial womb-incubators. For most other question, the discussion tends to characterise the physical maternal-foetal relation as one of container and content; life-support machine and subject; or even “fortress” and prisoner (Phelan, 1991). The *moral* relationship between gestator and foetus, meanwhile, is often analysed as one between two distinct (but specially related) individuals: (future) parent and future child (e.g. de Crespigny & Savulescu 2007). Both conceptions keep foetus and mother neatly separated in space and moral analysis: as distinct, non-overlapping individuals, with only spatial *containment*, the nature of *parental obligations*, and the ‘moral status’ of the developing foetus considered as posing complicating constraints for our philosophical analysis. This is the *foetal container model*.

#### *Criticisms of The Foetal Container Model*

The foetal container is not unique to philosophy; it directly mirrors our culturally dominant construal of pregnancy, evident anywhere from foetal imagery to our social and medical discourse. A rich tradition in history and sociology is devoted to identifying, contextualising, criticising and deconstructing that very depiction; demonstrating its recent development and historical contingency (e.g. McClive, 2002; Bergum; Duden 1993); emphasising the role of political and professional interests in its construal (e.g. Arney 1982; Petechsky, 1987); and explaining it more generally within the context of larger social, classed and gendered power structures (e.g. Casper 1998; Duden 1999; Katz-Rothman, 1994; Oakley 1984). These criticisms are further bolstered by a range of feminist philosophical work that has engaged various aspects of the experience and (lack of) symbolic representation of pregnancy to paint a picture that is decidedly unlike the foetal container model: metaphysically messy and ambiguous (Young, 1984; Kristeva, 1993; Irigaray, 1985; Howes, 2007), active and agential (Ruddick, 1994; Lindeman Nelson, 1994), constructed and transitional (Bergum, 1997) and characterized by intimacy and intertwinement (Little, 1999; 2005). All of this seems to directly challenge the strict separation that the foetal container model promotes.

These widespread criticisms make all the more surprising, not just that the foetal container model remains so widespread in the analytic literature, but that it is so implicitly and especially *uncritically* accepted. In only two places have I managed to locate an explicit articulation or defence of the model: Smith & Brogaard (2003) provide an empirical argument; Howsepian (2008) defends it on *a priori* grounds. But mostly the foetal container model seems to occupy the role of ingrained and implicit background truth.

By way of illustration, consider Olson (1997), who in a book-length treatment defends (1) that we were once foetuses, and (2) that we, as persons, are fundamentally organisms. This means, literally, that *we* once inhabited our mothers. But the puzzling questions that this might raise do not receive mention, not even in a footnote. This is telling. It suggests that to Olson and so many other authors, the foetal container model, which erases any interesting metaphysical relations during pregnancy, seems so obviously true that the possibility of there being interesting metaphysical consequences to our nine-month existence in the maternal organism does not even appear on the intellectual horizon. That is not a particular criticism of Olson or anyone else; it is entirely typical of the philosophical literature.

Even a cursory glance at anatomy, physiology and immunology, however, reveals that at least at the level of organisms, the foetal container model cannot be sustained so easily. (Kingma, *under review*, Pradeu, 2012; Howes, 2007). There is thus an ardent need for a critical examination of the foetal container model in the context of analytic metaphysics, and of the the implications of that investigation for our conceptions of e.g. humans, organisms, subjects and the self.

#### *Alternatives to the foetal container model.*

One might think that such an examination has already been undertaken; indeed many of feminist scholars mentioned above offer alternative ways of conceptualising the pregnant organism, and draw directly on pregnancy and other aspects of experience to criticise and sometimes reconceptualise notions of self, individual, subject and person (e.g. Young, 1984; Battersby 1998, Katz-Rothman). This work fits within a wider feminist tradition that, broadly speaking, tends to denounce the disembodied, neo-Lockian, self-regulating, rational and independent subject that emerges wholly formed from nowhere and was never raised (e.g. Kittay, 1999; Meyers, 1997). In its place feminists have tended to emphasize the importance of relationships and the body and/or embodiment (e.g. James, 2000), and proposed more fluid, relational, embodied and transitional ideas of the self.

Much of this work resists an easy uptake within analytic metaphysics, however. One reason for this is that, although somewhat belied by its lack of *actual* close attention to reproductive physiology, analytic metaphysics is broadly naturalistic in outlook. This requires an account of pregnancy, persons and organisms that is at least compatible with our best empirical understanding of what goes on at the level of organisms, their reproductive physiology and development. Most feminist work in this area, however – and for entirely

understandable reasons – has resisted such a naturalising outlook, focussing on the embodied subjective, agential and experiential aspects of pregnancy to engage directly with questions about persons at the level of subjects and selves. As such they have been strongly emphasising, quite rightly, that *persons* are pregnant – but have left unexamined that mammals are too. So although these feminist criticisms have resulted in, in my opinion, devastating criticisms of the foetal container model for moral and medical contexts (e.g. Lyerly et al, 2008; 2009), at the level of organisms the foetal container model has largely been left untouched.

Second, and perhaps in part because some feminist philosophers have been all too quick to denounce analytic metaphysics (Haslanger, 2000, James, 2000), the sometimes-troubling metaphysical implications of some of their views have been insufficiently investigated. Thus, despite pregnancy being such a core topic for feminist philosophy, neither the Stanford Encyclopedia entry on ‘analytic feminism’ nor the entry on ‘feminist metaphysics’, mentions pregnancy at all (Gary, 2014; Haslanger & Sveinsdottir, 2011).

### *Introducing BUMP*

There is a dire need for a project that bridges this gap: a philosophical investigation of the nature of pregnancy that combines metaphysical enquiry with our best empirical understanding of reproductive physiology, and our best philosophical understanding of organisms. Only this will force mainstream metaphysics to (re-) examine the foetal container model, and enable it and the legal and moral analyses that relies on it to seriously consider our gestational origins. Such an investigation is a fundamentally different and completely new way of thinking constructively and philosophically about the nature of pregnancy. In first instance this can exist alongside existing feminist analyses of these questions, which are mostly aimed at the level of persons and subjects directly, but it starts to intersect and may even complement and/or illuminate these when it starts to investigate the implications of the nature of pregnancy for organisms to questions about persons, where the implications of pregnancy are much less immediate.

## **Section b. Methodology**

The metaphysics of pregnancy will be investigated in five interdependent subprojects. The first of these, *metaphysics and physiology of pregnancy* articulates the metaphysical puzzles that pregnancy presents and formulates the central questions and hypotheses for the research project as a whole. The second subproject, *reproducing mammals* investigates these questions further in the context of our best philosophical understanding of *organisms*, whilst subproject three, *metaphysics nested entities*, investigated these same questions at their most basic and abstract metaphysical level.

Subproject four, *reproducing persons*, will then move the investigation to the level of persons, where the relationship with earlier findings on physiology and organism becomes increasingly complex and multi-faceted. Subproject five, finally, *translation and philosophical embedding*, investigates whether and how research findings about the metaphysics of pregnancy can be translated into moral and legal domains, and explores connections between the findings and methodology of this research project and the wider body of philosophical scholarship on pregnancy.

### **1. Metaphysics and Physiology of Pregnancy: Beyond the Foetal Container Model.**

Subproject one forms the backbone of the larger research project. It articulates the central research questions of the project and devises initial hypotheses in response that will be further refined and investigated throughout the project; outlines some of the assumptions and methodological commitments of the research project; and explores the relationship between this project and some more familiar philosophical questions upon which this investigation might bear.

#### *1.1 Alternatives to the Foetal Container Model*

What is the relationship between the pregnant organism and the foetus that inhabits it? According to the foetal container model, foetuses are merely inside the womb the way “a tub of yogurt is inside your refrigerator” (Smith & Brogaard, 2003: 74). The first important task for this subproject is to subject the foetal container model to analytic scrutiny, and develop possible alternatives to it.

This part of the project will closely engage with our best understanding of reproductive physiology to test the foetal container model. This has not been attempted, but even a cursory glance at pregnant anatomy and physiology suggest that the foetal container is very implausible – at least at the level of organisms. The foetus is connected by the umbilical cord to the placenta, which is an organ consisting of “maternal and foetal parts” that cannot be neatly separated into distinct maternal and foetal components (Fribourg et al., 2008). This firmly knits the foetus into the maternal anatomy so that, topologically, the one blends into the other (Kingma, *under review*), and so that, physiologically, functionally, metabolically – and even immunological understandings of the organismic self (Pradeu, 2012, Howes, 2007) – foetus and gestator appear to form one organism.

The project will also draw upon both empirical sources and feminist analyses to explore alternative models of the maternal-foetal relationship. An example of such an alternative model is the *part-whole model*,

according to which foetuses are a *proper part of* the pregnant organisms – like hearts, kidneys, nails and hair (Kingma, *under review*; Pradeu, 2012; Katz-Rotham, 1989). Although this is but one hypothesis, I will focus on and repeatedly refer back to it throughout this proposal, to illustrate how the questions and findings of different subprojects can bear upon each other.

### 1.2 *Pregnancy Prior to Persons.*

What are the entities, if any, that persist through pregnancy and birth? And what are their properties? Answering these questions poses methodological difficulties, for two reasons. First, because there are several entities to choose from – humans, organisms and persons, for example – and for each of those entities there is a further array of choices amongst competing philosophical interpretations of what those entities are. Second, because for any entity, an answer to the question must depend in part on the properties of that entity. But a central assumption of this research project is that we cannot properly understand those entities, or their properties, before we have a better understanding of the metaphysics of pregnancy.

The resulting circle is not vicious. But it does make some specific methodological demands. First, terms such as ‘human’ ‘person’ and even ‘organism’ are treated as mere placeholders throughout much of this investigation; the project shall remain, as much as possible, agnostic on the many meanings, associations and implications usually associated with these concepts – such as e.g. individuality, distinctness or moral implications. These, at least in principle, are open to revision in light of the findings of the project. Second, the project shall place the metaphysics of pregnancy prior to the metaphysics of persons. What this means is that ‘intuitions’ about the meanings or essential properties of humans, persons and organisms will be accorded a very low evidential weight. In, particular, in case of conflict, these will *not* trump revisions that appear necessary to accommodate pregnancy. This is necessary because we need to be at least open to the possibility that our conceptual toolkit is significantly biased in a way that makes pregnancy difficult to incorporate, and that – given that we always have a choice about which beliefs to revise and which we hold fixed (Quine, 1951) – makes us systematically disinclined to make the necessary revisions necessary to accommodate pregnancy. Not because pregnancy cannot or should not be accommodated, but because historically it has not been. To remedy this, pregnancy-related findings shall as much as possible be taken at face value, even if that means exploring radical or implausible-seeming revisions to potentially deep-seated and dearly-held assumptions about persons, humans or organisms.

Here is an example of why this is important, and how not to proceed. Consider Howsepian’s (2008) defence of the foetal container model, which relies on an *a priori* assumption that “no thing that is merely part of some other thing could be a human person” (2008:152). What is striking about his argument is not just that it so obviously begs the question, but that it so uncritically takes *that* particular assumption as immune to revision and as in need of no further justification. On what grounds? If it our best understanding of physiology suggests that humans begin in the womb (which Howsepian, who thinks foetuses are humans, seems to strongly suspect in this passage) then that is something that, and the implications of which, need to be explored. It cannot be dismissed *a priori* and without further justification, merely because it sits in tension with our favourite metaphysical and decidedly uninformed-by-pregnancy picture of ourselves, or because it seems ‘unintuitive’ from the (decidedly non-pregnant) philosophical armchair.

### 1.3 *The Multiplication Question*

Investigating the metaphysics of pregnancy may affect some very familiar and widely discussed adjacent philosophical questions. Here is an example: when do we, as humans, organisms or persons begin (see e.g. Anscombe, 1984; Olson, 1997; Smith & Brogaard, 2003). Although answers to this question are anything but united, varying from ‘at or shortly after conception’ (e.g. Anscombe, 1984; Damschen et al, 2006) to ‘years after birth’ (e.g. McMahan, 2002; Singer 1993), the philosophical literature has been relatively united in method; all believe that the answer will depend solely on the *intrinsic* structure or properties of the embryo/foetus/baby: properties that the foetus itself possesses. They do not consider *extrinsic* or *relational* properties of the foetus, such as its external relations to the maternal organism and the rest of the world, to be relevant at all. That those extrinsic relationships are so easily and commonly ignored is surprising, for compare another stock-philosophical example: a piece of rock. When a piece of rock comes to exist depends not on its internal structure or properties – how its parts hang together – but on extrinsic ones; when it stops being part of a (larger) rock face. The metaphysics of pregnancy may therefore bear on this question, and one of the tasks for this subproject is to explore and articulate the relationship between this project and familiar adjacent philosophical questions such as this one.

In addition to the above, subproject one shall focus on further questions raised by a proper philosophical investigation of the foetal container model in conjunction with reproductive physiology and development. These include e.g. questions about what the boundaries of the foetus are and what – if any – consequences that has for when human organisms can begin. It will also explore the implications of variations on the normal physiology of pregnancy, such as twins, conjoined twins, chimaera and various kinds of assisted and

alternative reproduction such as surrogacy, IVF, cloning and the possibility of artificial wombs. Meanwhile subprojects two and three will take up the initial findings of subproject one to be further explored, tested and refined in the context of philosophy of biology and analytic metaphysics.

## 2. *Reproducing Mammals: Organisms, Individuals and Other Biological Categories*

One way in which humans reproduce, is as organisms. And in this respect, we are no different from other placental mammals. Subproject two sets difficult questions about persons aside entirely to revisit and further investigate the central questions and hypotheses of this project for mammalian organisms: when do they begin? Can they be part of one another? And what *is* a pregnant mammal.?

Subproject two serves three important roles within the larger project. First, it ensures that we take seriously our mammalian aspect: it makes sure that we test the initial findings of subproject one against a biologically and philosophically rigorous account of what—qua organisms—we are. This ensures that later parts of the project, including claims about persons, are compatible with a solid account of our being organisms as well as persons. Second, an investigation of philosophy of biology may expand the traditional arsenal of tools and concepts with which we can approach questions about persons and persistence later on in the project. Third, it is independently interesting; a detailed investigation of mammalian pregnancy and the problems it presents may contribute to and enrich existing philosophical debates on biological individuality.

### 2.1 *Organisms*

If we thought that retreating from a question about persons to a question about organisms would make things easier, then the literature about organisms in philosophy of biology will quickly cure us of that notion. We do not have a clear concept of organism (Wilson, 2000), and the question when organisms begin is just as murky as the question when persons begin.

The first task for subproject two is to investigate whether an account of the mammalian organism – its boundaries, beginning (and end) – can be salvaged that is both biologically respectable and can underpin our common-sense conception of ourselves as individuals. Despite general scepticism in biology on whether a unified notion of organism is even usefully employed, this is not a wholly implausible aim: organisms may well be a marginal or special, as opposed to paradigmatic, case of biological individuality (Haber, 2013), but we only need an account of organism that is suitable to describe mammals – not one that applies to the whole biological world. Examples of the wide variety of accounts of organisms that exist and will be explored here include e.g. *non-marginal evolutionary individuals* (Godfrey-Smith, 2009); *homeostatic property clusters* (Wilson, 2005); *immunological accounts of the self* (e.g. Pradeu, 2010; Tauber, 1994); and *process-based accounts* (Dupre, 2012; Whitehead, 1933).

Exploring this question is independently interesting; few have juxtaposed the somewhat simplistic account of human organisms widely and implicitly assumed in other parts of philosophy to the much more complicated picture that emerges from biology. What philosopher, for example, when discussing persons-as-organisms, has worried about our symbiotic bacteria?<sup>2</sup> The combination of subprojects 2 and 4 is thus itself an innovative and interesting philosophical project. If a convincing account of the organism cannot be salvaged then that raises an important further question for philosophy and this project: how to individuate humans without being able to individuate human organisms (Clarke, 2010).

### 2.2 *Biological Individuality & Plurality*

So far I have focussed on *organisms*, but there may be further, as yet unconsidered ways of thinking about pregnant entities. Biologists happily recognise a vast array of biological individuals – many of whom are or may not be organisms – arranged in nested and sometimes cross-cutting or overlapping hierarchies stretching from sub- to supra- organismic level. Examples include proteins, prions, organs, organisms, superorganisms, groups, symbionts and biofilms, and on some accounts even species (e.g. Dupre & O'Malley, 2009). A second task for subproject two is therefore to explore whether an individual or category other than organism might be the best way to describe the pregnant entity, which again would serve to expand and refine subproject one's central hypotheses.

At this stage I want to highlight one possible, and, if so, independently interesting question that may arise here: the answer may well be that there are multiple correct answers. That seems a likely possibility because philosophy of biology is not only happy to recognize a dazzling plurality of nested and overlapping entities and individuals, but also has a notoriously friendly attitude towards ontological *pluralism*: the idea that, for example, several different but scientifically respectable accounts of species can exist in parallel (e.g. Kitcher, 1984; Dupre, 1993). Such happy pluralism, however, may stand in strong tension to, first, dominant strands of thought in metaphysics that worry about explosions of entities (e.g. Unger, 1980), and do their utmost to

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<sup>2</sup> Symbiotic bacteria are part of the organism according to some account, and if so provide 90% of our DNA. (Ackerman, 2012). Note that this DNA is only acquired after birth.

reduce them. These will be further investigated in subproject three. Second, pluralism, at least at first sight, does not seem an attractive proposition when it comes to persons or their boundaries.

Negotiating the apparent tension between biological and metaphysical approaches to organisms and persons is a potential main challenge for the overall project, and is something on which subprojects two and three – and eventually four – will need to collaborate closely. This is an area that may benefit especially in from a dialogue with feminist metaphysics and feminist conceptions of the self, because feminist accounts of persons have long been interested in accounts of persons that have less distinct boundaries and support more relations than the neatly bounded, philosophically traditional individual.

### 2.3 *Organisms, Biological Individuals and Pregnancy*

In addition to feeding forward into subproject four (*reproducing persons*) directly, the findings of subproject two will be examined in conjunction with subproject one's central questions and hypotheses on the synchronic and diachronic relationships between foetuses, pregnant organism, and future mother and baby. Exploring these questions in the context of philosophy of biology is likely to be particularly fruitful because one of the striking things about biology is that interesting synchronic and diachronic metaphysical relationships between organisms seems to be the rule, rather than the exception. Coral reefs for example are sometime considered organisms that consist of smaller organisms, polyps, which themselves depend on even smaller organisms, zooxanthellae (Turner, 2000). And on some conception of species, organisms themselves are the temporally and spatially extended parts of a larger spatially and temporally dispersed individual: the species (Hull, 1978). Subproject two is therefore likely to suggest accounts of the nature of pregnancy that we might not otherwise have thought to consider had we only focused on humans, whilst making others less attractive that might have seemed very plausible from an anthropocentric point of view.

### 3. *Metaphysics of Nested Entities: Mereology, Identity, Persistence and Constitution.*

A rejection of the foetal container model suggests that there are both metaphysically interesting diachronic relations between foetus and future baby – such as identity and persistence – and metaphysically interesting synchronic (and diachronic) relations between foetus and maternal organism – such as, for example, a part-whole one. This seems to raise interesting metaphysical questions, which subproject three will articulate and explore at their most basic and abstract level.

Subproject three has three important roles within the project. First, just as subproject two keeps the project biologically informed, and ensures later solutions remain compatible with our being mammals as well as persons, subproject three keeps the project metaphysically grounded, and is there to ensure we do not arrive at later solutions that invoke impossible solutions. Second, it solves problems where they arise; some problems about personal identity may not, primarily, be problems about persons, but reflect more general problems in the metaphysics of identity (Olson, 2010). Pregnancy may be one of these. Third, I hope that subproject three, like subproject two, is a place where an investigation of pregnancy bears direct fruit; I think it may raise metaphysical problems that are interesting in its own right.

To illustrate the sorts of basic metaphysical puzzles that pregnancy might raise and why an exploration of them at this very basic level will be interesting, I shall focus once more on the part-whole hypothesis.

#### 3.1 *Alternatives to the Foetal Container Model: metaphysical development.*

Subproject two and three develop alternatives to the foetal container model. But these alternatives require further development. In the part-whole model, for example, the notion of 'part' needs specification, because the notion of parthood I have in mind is not a thin one that is exhausted by the axioms of classical mereology; rather it is a more substantial notion – incorporating, for example, topological, temporal, causal and/or functional aspects, and depending possibly on interdependence, mechanism, processes and so on. There also questions about the possibility of distinguishing *kinds* of parts; there seem to be substantial difference between hearts and hairs, for example, that might be developed in terms of whether an entity can survive the loss of them. Thus a first task for subproject three simply is develop and test further earlier hypotheses in the context of metaphysical questions about e.g. persistence, constitution, mereology etc.

#### 3.2 *Parts, Wholes and Homoeomeri*

Suppose the foetus is a part of the maternal organism. Also suppose that the foetus and the maternal organism are different tokens of the same type of entity: an *H*, a human being, person, human organism, or similar. If we put those two premises together, then the pregnant organism is an H-whole, which has an H-part: the foetus. That is, the pregnant organism is a human (organism) (*Hp*) that has another human (organism), the foetus (*Hf*) as a proper part. This makes the pregnant organism (at the abstract level) a very interesting metaphysical object that may be characterised as a species of *homoeomerous* entity.

A homoeomerous entity is 'like-parted': it can in principle be divided into parts that are of the same type as the whole. Traditional homoeomerous examples, such as a portion of snow, are homogenous all the way

down: *any* division in parts would result in objects that are of the same kind as the whole: portions of snow<sup>3</sup>. But there are other objects for which only *some* subdivisions result in parts all of which are of the same kind as the whole. An example is the Pharaoh's crown, composed of the crowns of the upper and lower Nile. For yet another kind of object, only *some* of its parts are of the same kind as the whole. An example is the Pope's crown, which consists of three crowns plus a 'residue': a structure to hold them together.

Examples such as these raise puzzles about identity, individuation and reference. Wiggins, for example, writes "the concept crown gives a satisfactory way of answering identity-questions for crowns. But there is no universally applicable definite way of counting crowns. [...] There is no definite answer, when the Pope is wearing his crown, to the question 'how many crowns does he have on his head?'" (1980: 73). An engagement with these puzzles may therefore inform a successful articulation of the metaphysics of pregnancy, and as such is an important component of this research project. At the same time, thinking about pregnancy may itself further theoretical metaphysics in this area. At least one further interesting feature of the pregnant organism, for example, is that the pattern may repeat itself if we take its temporal dimensions into account: fetuses may one day become pregnant organisms themselves, containing a further H-part.

### 3.3 Pregnancy and Maximality

The above exposition does not exhaust the questions raised by the hypothesis I focused on here, but I shall only briefly mention one more: if the pregnant organism is an H-whole that has an H-part, then at least on the face of it this violates maximality constraints (e.g. Sider, 2001). Maximality constraints hold that "no cat is a proper part of a cat" (Hawley, 2001:166). It seems worth considering pregnant cats in this context.

I hope the above gives a flavour of the type of questions that a metaphysical investigation of pregnancy may raise. Note that these are just based on one particular hypothesis about foetal-maternal relations: the part-whole hypothesis. Others will raise other interesting and abstract metaphysical questions, such as questions about composition and overlap. Some of these look like interesting contributions to metaphysics in their own right, but they also offer the potential for entirely novel insights in and perhaps even solutions to questions about organisms and/or persons that are usually approached at a very different level of abstraction. This is something on which this subproject will have to collaborate closely with one, two and four.

## 4. Reproducing Persons: Self, Other and Future Self

Subprojects two and three, as well as being independently interesting, both serve as quality controls and input into subprojects four and five. They ensure that the project as a whole considers solutions that are compatible with our mammalian aspects; have properly examined their metaphysical commitments; and prevents us from jumping to conclusions that we might anthropocentrically, politically, or non-pregnancy-informed-'intuitively' endorse, but that are not compatible with scrutiny in these other domains. With those projects underway, and drawing on their input and quality control, project four focuses its attention on where, ultimately, we are likely to be most interested in answers: persons. This subproject focuses on two main questions: (1) what the metaphysics of pregnancy implies for what persons are, and (2) how pregnant persons relate to their past and future selves, including their offspring.

### 4.1 Personal Ontology

What are we? Most philosophers think that we are persons. But what are persons? There is no consensus on the answer. Some believe that we are organisms, some believe that we are brains, or minds; some believe that we are *constituted by* organisms, some that we are immaterial souls; some that we are bundles of perceptions, narrative agents or a series of discursive social practices; some that we are four-dimensional spatially and temporally extended worms, and some that we do not persist at all; we only exist at the briefest slice of time. (Olson, 2007, gives a good overview of some these positions and arguments).

This project will not arbitrate this debate. What it will do, however, is investigate the implications of a decent metaphysics of pregnancy for accounts of what we are. That involves, first, an attempt to shed direct light on existing organism-based accounts from the perspective of an organism that, first, is biologically plausible (as per subproject two) and, second, that originates in, and is capable of, pregnancy. Questions will include: is the independently interesting, biologically respectable and sophisticated account of organism to be developed in subproject two compatible with an organism-based account of persons? How would it affect such an account? And how does an account of persons as organisms accommodate the peculiar intertwined nature of pregnancy? Answering these questions may involve having to negotiate possible, earlier-alluded-to tensions between pluralism about organisms and monism about persons (Olson, 2007).

Second, this represents a broader effort to force the wider literature on persons to take our gestational origin and ability seriously. Amongst others this means exploring whether accounts of persons that do not posit a very close relationship between persons and organisms – e.g. accounts of us as minds or bundles of

<sup>3</sup> This holds only up to a point; at some point the parts cease to be portions of snow and become snowflakes.

perception – are affected by earlier findings of the metaphysics of pregnancy. One might think there are no such implications, but such accounts still have to contend with our having *bodies* or *being embodied*. The implications of the metaphysics of pregnancy for bodies/embodyment is worth exploring whatever the relation between organisms and persons, particularly considering the importance of bodies in ethics.

#### 4.2 *Self, Other, Future*

It is not controversial that there is one female organism/person (*Of/Pf*) before a pregnancy, and (usually) at least two organisms/persons after: a mother organism/person (*Om/Pm*) and an off-spring organism/person: the baby (*Ob/Pb*). How do these organisms and persons relate to each other? The foetal container model promotes a very simple conception where (1)  $Of = Om$  (and  $Pf = Pm$ ); (2) where at some (to be determined, and not necessarily identical) point the offspring organism (*Ob*) and person (*Pb*) come into existence; and (3) where offspring persons/organisms and female/mother persons/organisms are never anything other than completely distinct from each other. This picture underlies most of our moral and legal analysis, but that it is not the picture that first-person centred reflections on pregnancy report as intuitive (e.g. Young, 1984).

This part of subproject four explores whether and how earlier findings on the metaphysics of pregnancy pertaining to organisms (subproject one and two) and abstract metaphysical objects (subproject three) can help us rethink traditional questions about personal identity and the diachronic relationships between pre-pregnant persons, pregnant organisms, mother and offspring. I envisage exploring, for example, whether the metaphysical peculiar nature of pregnancy may offer the resources to originate the identity of offspring in its gestating parent, which might provide (1) new ways of approaching the earlier mentioned non-identity problem (Parfit 1984) and (2) new ways of conceiving prudential relations between women and their future offspring. Such new ways of thinking about prudential relations may eventually feed into new ways of thinking about the moral obligations of pregnant and pre-pregnant woman towards (future) offspring. I also envisage exploring how the metaphysics of pregnancy relates to traditional thought experiments in the philosophy of personal identity that involve ‘splitting’ and brain transplants (e.g. Parfit 1984; Lewis, 1976; Noonan, 2003). Such examples are sometimes criticised for being hopelessly outlandish and uninformative, especially when there are underexplored and interesting test cases for personal identity available in the actual world (e.g. Wilkes, 1988). It will therefore be interesting to place the metaphysics of mammalian reproduction alongside these thought experiments as such a real life example, and explore what either can learn from the other. It will also be explored how the results of this investigation intersects with feminist accounts of the person/self, and whether they can illuminate some of the more puzzling things that feminist philosophers have said about pregnancy, which involve reference to e.g. splitting, parthood, and the discontinuity between the pregnant women and post-birth mother (e.g. Young, 1984).

### 5. *Philosophical Embedding and Translation*

Subproject five rounds the project off and provides an opportunity to translate the findings of this project into a wider theoretical and applied setting.

#### 5.1 *Ethics: rewriting our language.*

This is not a project in ethics; the moral consequences of the metaphysics of pregnancy simply fall outside of its scope, chiefly because those are large questions in their own right. Similarly, many other questions that are raised in the context of this project, such as the nature of fatherhood, and of genetic and social (in contrast to gestational) parenthood (e.g. Millum, 2008) cannot here be answered. I envisage applying for follow-up grants to investigate those questions and the moral consequences of the findings of this research. But that does not mean BUMP’s findings are without immediate application: they put us in a better position to approach those other questions.

The task for subproject five is to make the project’s research findings applicable by investigating, problematizing, and where possibly rewriting the assumptions encoded in our (moral) language. This will facilitate an immediate uptake of BUMP’s findings in philosophical and moral discourse. Take, for example, the term ‘person’. When we ascribe personhood to someone or something, then this is useful because it warrants reliable inferences to certain metaphysical and moral implications: persons are individuals; they are self-owners; they have rights against being killed or otherwise interfered with. But all these inferences tacitly assume that persons are physically and metaphysically distinct. Because this project may find that persons do not (always) possess the properties we take them to possess, we may have to rewrite to connection between our language of persons and the inferences that category licenses.

For example, if persons are not distinct, then some of the ordinary inferences the term ‘persons’ supports are no longer warranted, and the moral language we use to describe their interactions with each other may itself turn out to be inadequate; the distinction between interference versus non-interference, for example, may be incommensurable with the indistinctness of persons. Thus if some, or all, persons do not have the properties we tacitly assume them to have, we have to reconsider the moral implications of personhood and the moral, practical and legal language we use to describe those implications.

### 5.2 Philosophical Embedding.

In articulating its research questions, this project draws heavily upon a range of philosophical and other disciplines. But when it seeks to answer those questions, the project works mostly within the framework of contemporary analytic and naturalistic metaphysics, paying close attention to pregnant physiology and philosophy of biology, and considering questions about organisms before it moves to the more murky terrain of persons. This is justified because (1) this is a very innovative, fundamental and excitingly multi-faceted and interdisciplinary way of addressing these research questions, that has been overlooked both by earlier feminist treatments and metaphysical non-treatments of the research questions; (2) it offers perhaps the only way of engaging those parts of metaphysics and philosophy where considerations of the nature of pregnancy are most absent, yet where that absence needs most urgent addressing; and (3) because it offers a way into the metaphysics of pregnancy that is mostly likely to find some agreement – for even if we remain in ferocious disagreement about persons, surely we can agree more easily at the level of organisms. What this leaves relatively unaddressed, however, are some of the broader substantive and methodological relations to predominantly feminist inspired analyses of pregnancy in other traditions.

This part of subproject five offers the space to explore some of these wider relationships and part of the final project conference will be devoted explicitly to this question. This will provide a forum for dialogue between a diverse range of scholars. Such a dialogue is often considered difficult; the relationship between feminist theory and (analytic) metaphysics – and more generally the relationship between analytic philosophy and various other philosophical traditions – is often one of mutual distrust and perceived incommensurability. Indeed some argue that feminist theory must undermine the entire project of analytic metaphysics (e.g. Fraser & Nicholson, 1990; Tyler, 2000). Others, however, defend a role for metaphysics nonetheless (Battersby, 1998); argue that the dichotomies are overstated; and even explicitly carve out a positive role for feminist theory in influencing analytic metaphysics that very closely resembles the role it plays in this project (Haslanger 2001). This part of subproject five engages some of these debates, exploring how the investigation in this project may strengthen, undermine and/or address them.

### **Interdependence**

BUMP's five subprojects, (1) *metaphysics and physiology of pregnancy*, (2) *reproducing mammals*, (3) *metaphysics of nested entities*, (4) *reproducing persons*, and (5) *philosophical embedding and translation*, form an interdependent and coherent whole, and close collaboration between them is envisaged. Subproject one, *the metaphysics & physiology of pregnancy*, provides the backbone of the research project, and provides the questions and assumptions that feed and will be further investigated in subprojects two, *reproducing mammals*, and three, *metaphysics of nested entities*. These two projects will run in parallel in years two to four, and engage in close dialogue with each other. They will act as a quality control on the overall project, ensuring that any of its findings respect both our best understanding of ourselves, qua organisms, as well as basic constraints of logic and metaphysics. Their findings will feed back into ongoing research on subproject one, *metaphysics & physiology of pregnancy*, as well as feed forward into subprojects four, *reproducing persons*, and five, *philosophical embedding and translation*. These latter two subprojects investigate the central questions and earlier findings of the project in the context of persons (subproject four) and translate these findings into language (subproject five), which means they can be taken up in and applied to practical moral and legal questions, as well as embedding the project more broadly in the literature on pregnancy.

### **Scientific and Social Importance**

#### **Scientific Importance**

BUMP fits exceptionally well within the ERC remit for High Risk/High Gain Research. It is novel, methodologically and conceptually innovative, interdisciplinary, ambitious, ground-breaking, bold, fundamental, and with wide practical remit.

BUMP focuses on a completely *novel* topic that is woefully neglected in analytic philosophy, and approaches that topic in a *conceptually innovative* way: not by treating it as a liminal form of existence, but as central to our understanding of ourselves and our interactions. It places the metaphysics of pregnancy prior to many other metaphysical and conceptual commitments.

The project engages a wide range of literatures and empirical findings from within and outside philosophy, most notably physiology, history, biology and feminist theory. This makes the project *interdisciplinary* as well as *methodologically innovative*; the areas in philosophy it aims to combine rarely converse closely, nor are many of them brought in close dialogue with our best scientific understanding. The project is *fundamental* because it does not look at pregnancy through the biased lens of a particular moral or social question or agenda – such as the morality of abortion or the oppression of women – or in uncritical acceptance of the socially dominant images of pregnancy. Instead it will build a philosophical understanding of pregnancy that is attentive to our best understanding of reproductive physiology of pregnancy, our best

philosophical understanding of organisms, and a metaphysically consistent treatment of the entities and processes – whilst being aware that these, too, are not immune to socio-cultural bias and construction.

The project is *ambitious* in both size and scope. It launches a large project that brings together an unusually wide range of difficult philosophical questions. These are normally treated in isolation from each other, but through in-depth investigation of these questions and the relations between them, BUMP is aiming to take on widely established philosophical assumptions. This is *ground-breaking* because BUMP has the potential of overturning and affecting core practical and philosophical assumptions about what we are and how we relate to the world and each other, and bold because it is willing to take on those assumptions. Finally, BUMP has a *wide scholarly and practical remit*. The former because its resulting understanding of the nature of pregnancy affects the academic topics discussed as part of the proposal, for example by motivating a significant reevaluation of seemingly-better-understood and certainly-more-extensively-studied notions such as 'organism', 'person', 'personal identity' and part/whole relationships. The latter because BUMP affects practical social, medical and moral questions, as well as questions in other humanities disciplines. These include questions about the moral, medical and legal treatment and obligations of pregnant women, as well as our personal and cultural understanding of ourselves, our relations to our parents, and relationships between parents and offspring.

### ***Social Importance***

These are not mere academic questions; they are practical. At this very moment, courts attempt to rule whether women can undergo forced Caesarean Sections on behalf of their foetus' or future offspring's wellbeing; whether women who smoke or take other toxic substances during pregnancy can be held criminally liable; and who, in case of conflict, has final rights over the contents of a (surrogate) mother's womb. Less dramatically but possibly more seriously – and certainly more commonly – doctors and medical ethicists struggle to assimilate the facts of maternal-foetal intertwinement, maternal autonomy, and the different risk profiles that intervention-options present to mother and foetus into a coherent reasoning process and morally and/or clinically adequate recommendation; lawmakers wonder how we can consistently criminalise feticide without criminalizing abortion; and pregnant women all over the world fret over the risks and benefits of jogging, eating fish and drinking alcohol – or working in their field or engaging in a possibly risky profession – in the context of balancing their duty of care to self, foetus, present and/or future offspring. Although a proper understanding of the nature of pregnancy will not immediately settle these issues, it is a first necessary step; without such an account we have no hope of ever settling them at all.

This project is committed to realizing its social impact, in two important ways. First, whilst not itself a project in ethics, BUMP is committed to translating its findings so that those currently engaging in relevant areas of moral, legal and bioethical enquiry are able to take the findings of this project on board. That, in academic terms, is the role of the ethics component of subproject 5, *philosophical embedding and translation*. Second, the project will actively communicate the broader implications of the project – the renewed conception of the metaphysics of pregnancy – to a wider audience including those working in clinical medicine, policy makers, lawyers, and the people this project is about: all of us. To this end a dedicated person research, administrative and knowledge transfer assistant will be employed on the project, as I will explain further under implementation.

### **Feasibility & Implementation**

#### ***Preparation and Proof of Concept***

Essential groundwork for this project has already been laid, which warrants initial confidence in the viability of its overall radically new research direction. Early versions of two research papers that provide the background to this research project, one articulating some of pregnancy's philosophical questions and another criticising Smith & Brogaard's (2003) defence of the foetal container model, have been presented to internal audiences at Cambridge, King's College London, Southampton and Eindhoven as well as two peer-reviewed conferences. Both have received very positive responses, generating invitations to speak about this topic in additional venues.

In addition, the University of Southampton has awarded this research project a prestigious £6,000 'proof of concept' grant under their 'Adventures in Research Scheme'. This scheme supports the development of research ideas in their earliest stages, and as such recognises the exceptional promise and novelty of this project. With help of a further £1,000 from the interdisciplinary 'Southampton Ethics Centre', this award supports four workshops (June, 2014, April 2015, June 2015, Sept 2015) that help to refine the research questions for this project, build a network of supporting scholars within and outside philosophy; and explore its connections to moral and legal questions. Past and confirmed speakers to these workshops include Rebecca Kukla (Georgetown, Philosophy); Hazel Biggs (Southampton, Law); John Dupre (Exeter, Biology); Sally Fischer (Warren-Wilson); Thomas Pradeu (Paris, Philosophy); and Rosamund Scott (KCL, Law).

### **The Team**

Seven Core Individuals will be conducting research on this grant. As PI, I will be devoting 70% of my time on this project, over the course of five years. Two Post-Docs with three-year tenure each and two PhD students will be recruited during the first year of the project, to start at the beginning of the second year. A senior philosopher specializing in ethics will join the group for the final two years, and a half-time Administrative, Research & Knowledge Transfer Assistant will be appointed for the duration of the project.

#### *Justification for Post Doctoral Philosopher of Biology.*

Subproject two, *reproducing mammals*, ensures that the research project as a whole engages with our best philosophical understanding of organism. This first, makes sure that the outcomes of the research project cannot fall foul of our mammalian aspects; second allows us to draw upon the resources of philosophy of biology to illuminate and inform/improve BUMP's central questions; and, third lets us assess the implications of the nature of pregnancy for existing debates and concepts in philosophy of biology itself.

Subproject two represents a considerable and important chunk of research and requires the full time attention of an experienced researcher who is already familiar with the relevant literature in contemporary philosophy of biology, most notably state of the art research on organisms, biological individuals and levels of selection: a post-doctoral philosopher of biology.

#### *Justification for Post Doctoral Metaphysician*

Subprojects three, *metaphysics of the nested entities*, and four, *reproducing persons*, deliver large and difficult metaphysical problems that need to be tackled by someone already well-versed in the area of metaphysics. This is not a project that can be undertaken by a beginning researcher; a post-doctoral metaphysician will be needed to bring their time, experience and expertise to these projects.

#### *PhD Students*

Two PhD students will be working on relatively self-contained sub question of the research project. They will be supervised by me, but encouraged to also draw upon the expertise of the two postdocs, who will thereby gain valuable supervisory experience.

- *PhD project One – Selection, Goals and Maternal-Foetal Conflict*: One problem for medicine is how to think about 'maternal foetal conflict': instances in which maternal and foetal bodies appear to be competing for resources. This is conceptualized sometimes as an exception or as a pathology, but at other times as a pervasive feature of pregnancy. In the latter case it may be seen to provide an argument against the metaphysical interest of pregnancy. The aim for this PhD project is to develop a more sophisticated understanding of goal-directed functioning of the pregnant organisms. We know from evolutionary biology that conflict and competition, as well as cooperation, are pervasive features of the biological world that happen at different levels simultaneously. Can an account of pregnancy be developed that posits conflict neither as the exception nor the norm, but on a spectrum of normal functioning?

- *PhD project Two – Metaphysics of Foetal Development*: Many philosophers have asked when and whether foetuses become persons. Some have looked closely at foetal development. None have taken the relation between the foetus and maternal organism into accounts. If we consider that relationship, new questions arise. What, for example, are the boundaries of the foetus? Does it include placenta, amniotic sac and chorionic membranes? It is often assumed that, if anything, only 'the foetus proper' can lay claim to being a (future) human. But why is this? This project rewrites the metaphysics of foetal development.

#### *Justification for Specialist in Ethics*

Subproject five, *persons and their interactions*, engages the relation between metaphysical assumptions and the language used to frame legal, moral and practical questions; notably the language of persons and their interactions. This requires the part-time input of an experienced ethicist, already well-versed in this language. A one-year postdoc could be hired for this purpose, but Southampton already employs someone with just the right combination of interests: Dr Woollard has written on both the distinction between doing and allowing and self-ownership (e.g. Woollard 2011, 2013, forthcoming) and has the right combination of expertise to investigate this part of the project. She will also be able to spread her contribution over two years, which allows her contribution to be more fully integrated with the rest of the project.

#### *The PI*

As PI, I will oversee the project, provide leadership to all members of the team and ensure that BUMP implements its collaborative and interdisciplinary methodology, and delivers on its promises. I will also supervise the PhD students; conduct a significant part of the research – most notably on projects one, *metaphysics and physiology of pregnancy* and four, *reproducing persons*, and the second component of subproject five: *philosophical embedding*; and devote time to engagement and knowledge transfer, in close collaboration with the knowledge transfer assistant.

I will divide my time on the project as follows: 75% in year one will allow me to set up the project, hire staff, and conduct research on subproject one which will include the writing of a proper proposal for a monograph launching the metaphysics of pregnancy. 50% in year two will allow me to continue these activities and start of the newly-hired students and postdocs. 100% in year three will give a strong mid-project focus which will allow for the completion and submittal of the monograph, as well as a shift in my attention from subproject one *metaphysics and physiology of pregnancy*, to subproject four, *reproducing persons*. 50% in year four will allow for my continuing that research, my assisting PhDs and PostDocs in the completion of their projects, and collaboration with Dr Woollard on subproject five, *persons and their interactions*. Finally, 75% in year five will allow me to round up the project, with a heavy emphasis on knowledge transfer, and apply for follow-up funding where applicable.

I am uniquely suited to lead this project. I have broad and interdisciplinary background with Masters level degrees in clinical medicine, cognitive psychology, and history and philosophy of science, a PhD in philosophy, and post-doctoral training in bioethics. I have run large research projects in the past, setting up several clinical studies as an undergraduate student in medicine and supervising student assistants in the course of these. I have a proven ability to publish in different disciplines, having written for medical, psychological and even history journals, as well as the popular press. I manage to combine this with publishing in top-level philosophy journals; my first publication in *Analysis* was submitted and accepted within two years of my first starting to study philosophy, evidencing not only the calibre of my work, but the originality of my ideas – of which this project is another example.

#### *Justification for a Research, Administration & Knowledge Transfer Assistant*

Knowledge Transfer is often promised, and rarely properly implemented. That is why an additional and dedicated individual on this project will take the lead on knowledge transfer, more details of which are provided in the final section of B1, ‘impact, engagement and knowledge transfer’.

The knowledge transfer assistant will have a PhD in a relevant discipline, excellent communication and social skills, and an interest in the project. This is the perfect position for someone who is looking to transfer from academia to a more policy- or communication focused career.

#### **Academic Activities**

To ensure ongoing interdisciplinary engagement of the project, as well as inter-group collaboration, the following activities are planned for which funds are requested:

In years 2 & 3, visiting speaker workshops will be organized in which one or more day-visitors present work and engage closely with the team who will be expected to prepare by reading work in the visitor’s area. These workshops will have a strong interdisciplinary character, and this will act partially as an educational program; whilst I have a broad background and familiarity with the wider medical, social and historical context that informs the project, this may not be the case for all researchers. These workshops will ensure an awareness of this broader context as well as ensure that the team can discuss their work with outsiders. Not all of these visitors need be academics; some will be e.g. lawyers or health care professionals.

Some of these workshops will be open to a wider audience, according to the highly successful model for interdisciplinary engagement that I developed at KCL (Kingma, 2011) and as such will also function as focus groups that serve to create a network beyond academia that can support and disseminate this project.

In year 4 a large international conference will be organized that will focus more on the academic dissemination of research findings, and on cementing a global intellectual community.

Funds are also requested to arrange for a Visiting Fellow to come to engage in the project for a term. This will be a valuable opportunity for the team to engage with a specialist in the field; these people will be invited in year 2, 3 and 4. Interdisciplinary visitors will be particularly welcome and the expert will be expected to engage in the activities of the team. To ensure collaboration within the group, weekly development sessions will be held – the equivalent of a lab-meeting in science. Development sessions will normally take the form of a reading group, with reading suggested by group members, including their own work. These sessions will also be a venue to present mini-briefs on ongoing research findings deemed relevant to the group. Visiting Scholars will also be expected to participate in and present at these sessions.

#### **Knowledge Transfer & Engagement and Key Outputs**

Knowledge Transfer Activities and Key Outputs are described in detail at the end of the extended synopsis in part B1 of this proposal, and are therefore not repeated here.

**Section c. Resources (including project costs)**

The following Resources are requested (see table below for amounts, section b ‘methodology’ for details):

- Salary Costs for the Team Members (See ‘The Team’)
- Funds for Travel to Academic Conferences and Meetings to Disseminate Research
- Funds to Facilitate Open Access Publication
- Funds to Support Knowledge Transfer & Engagement Activities (See B1 ‘Knowledge Transfer’)
- Funds to Support the Academic Activities on this grant (See ‘Academic Activities’).

Cost Category		Total in Euro	
Direct Costs	Personnel	PI	274,742
		Senior Staff	72,269
		Postdocs	348,916
		Students	131,680
		Other (Knowledge Transfer Assistant)	136,716
	i. Total Direct Costs for Personnel (in Euro)		964,323
	Travel		33,750
	Equipment		
	Other goods and services	Consumables	54,000
		Publications (including Open Access fees), etc.	13,500
		Other – workshops/conferences	40,500
		Other – visiting fellows	40,500
		Other - audit	8,775
	ii. Total Other Direct Costs (in Euro)		191,025
<b>A – Total Direct Costs (i + ii) (in Euro)</b>		<b>1,155,348</b>	
<b>B – Indirect Costs (overheads) 25% of Direct Costs (in Euro)</b>		<b>288,837</b>	
<b>C1 – Subcontracting Costs (no overheads) (in Euro)</b>			
<b>C2 – Other Direct Costs with no overheads (in Euro)</b>			
<b>Total Estimated Eligible Costs (A + B + C) (in Euro)</b>		<b>1,444,185</b>	
<b>Total Requested EU Contribution (in Euro)</b>		<b>1,444,185</b>	

<b>For the above cost table, please indicate the duration of the project in months:</b>	<b>60 Months</b>
<b>The % of working time the PI dedicates to the project over the period of the grant:</b>	<b>70%</b>

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